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Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

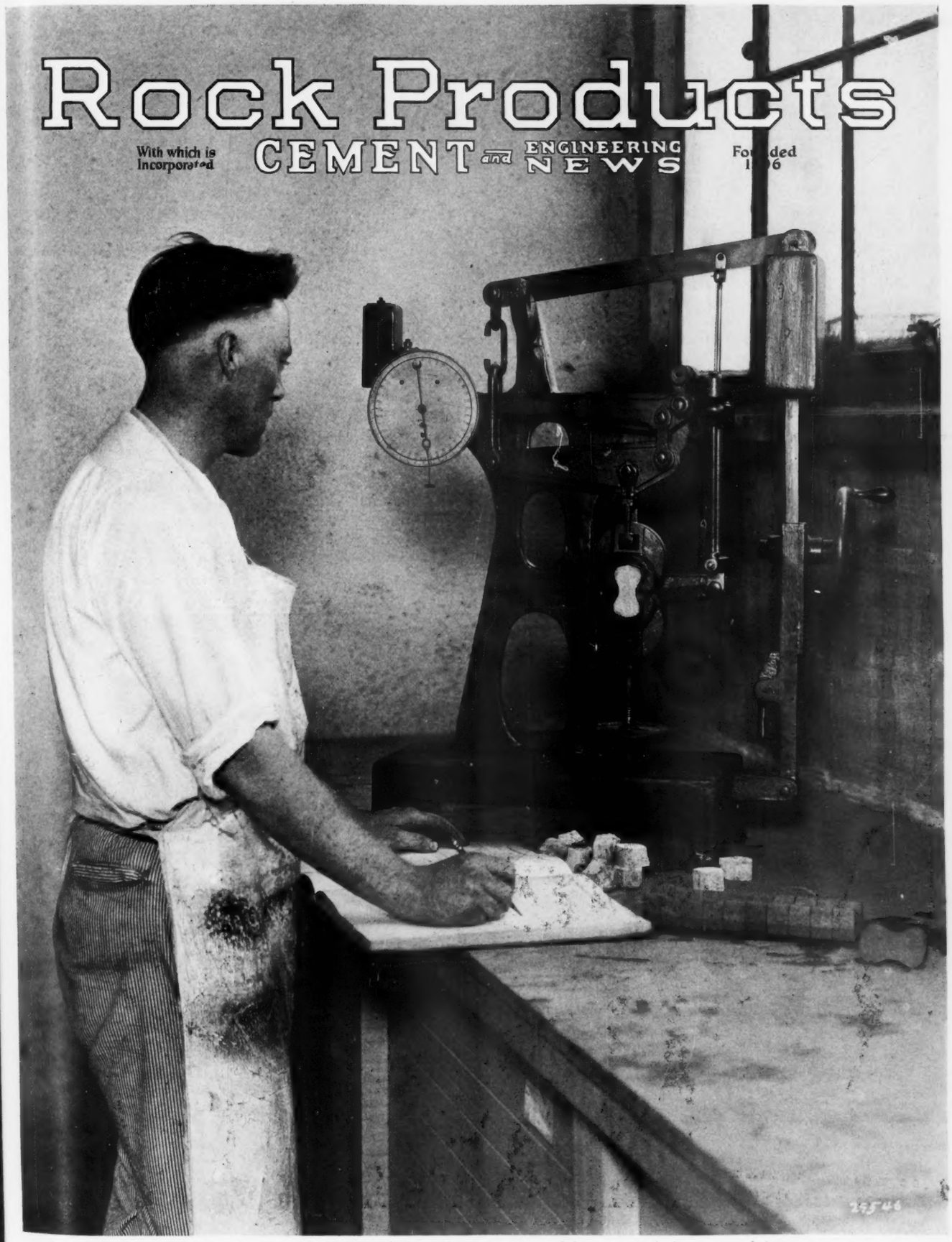


Photo courtesy of International Cement Corp.

A picture that needs no caption—to rock products producers

Effective Slurry Mixing—the Key Operation in Cement-Mill Chemical Control

By A. Anable
Engineer, The Dorr Co., New York City

JUDGED BY THE EFFORTS made in all wet-process cement plants to produce a uniformly high grade product, one which in most cases not only meets but actually exceeds the exacting quality specifications of the Portland Cement Association, it is only natural that the plant chemist's interest centers around the slurry-mixing tanks. If the mixing has not been such as to render his grab samples representative of the contents of the tanks as a whole, and if accordingly he allows a tank's contents to be burned in the kilns without knowing to a certainty that his apparently satisfactory analysis of the sample reflects the condition of the slurry as a whole, then indeed the careful chemical control which he has exercised from the start might just as well be discontinued.

From a control standpoint, the portland cement industry is essentially a part of the broad group of process industries comprising our chemical field. That those responsible for the conduct of manufacturing operations are becoming *research conscious* is one of the outstanding features of our present day business life. It can be said that few of our major industries have profited by this unmistakable trend to a greater extent than cement manufacturers. One large company in this field proudly points to the fact that its chemical staff at each of its many mills not only performs routine analyses and tests, but also actually supervises and controls every single operation in the process cycle from the quarrying of the rock to the final grinding of clinker and gypsum into a high grade cement of uniform physical and chemical composition.

How Cement Slurry Differs From Other Mineral Pulps

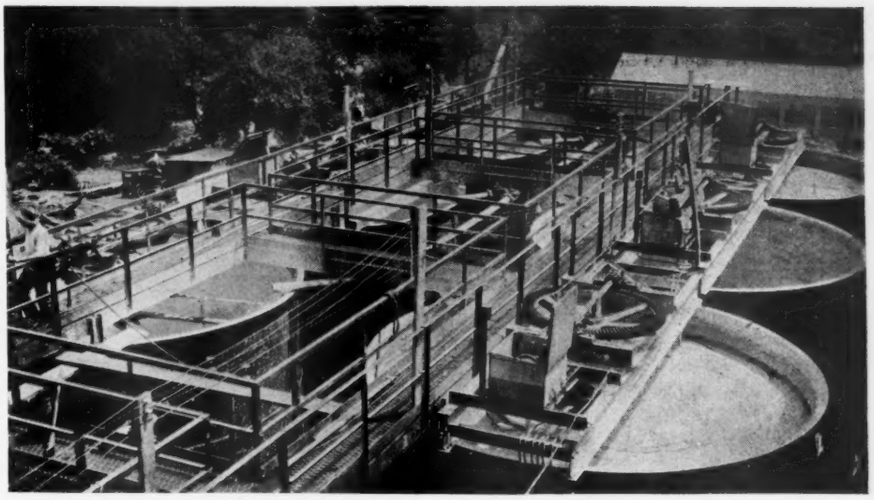
The agitation of cement slurry is a problem involving many factors not encountered in other fields. For the reason already mentioned it is, however, one of the most important operations in the process cycle and accordingly is one to which constructive engineering thought may be applied with profit. In the first place it is a denser mineral pulp than is encountered in any of the metallurgical or chemical fields and, although the particles of which it consists are relatively finely divided, it has an extremely high viscosity. Added to these characteristics there is a very definite tendency for the slurry to cake upon exposed surfaces and dry out as a hard impervious mass.

Three other physical characteristics are immediately noticed when attempts are made to mix by mechanical means alone the contents of two or more tanks, varying slightly in calcium carbonate content. General practice calls for the plant chemist's analyzing samples from each of these tanks and then giving orders to the operators as to how many feet of slurry from each tank are to

Photo courtesy of International Cement Corp.

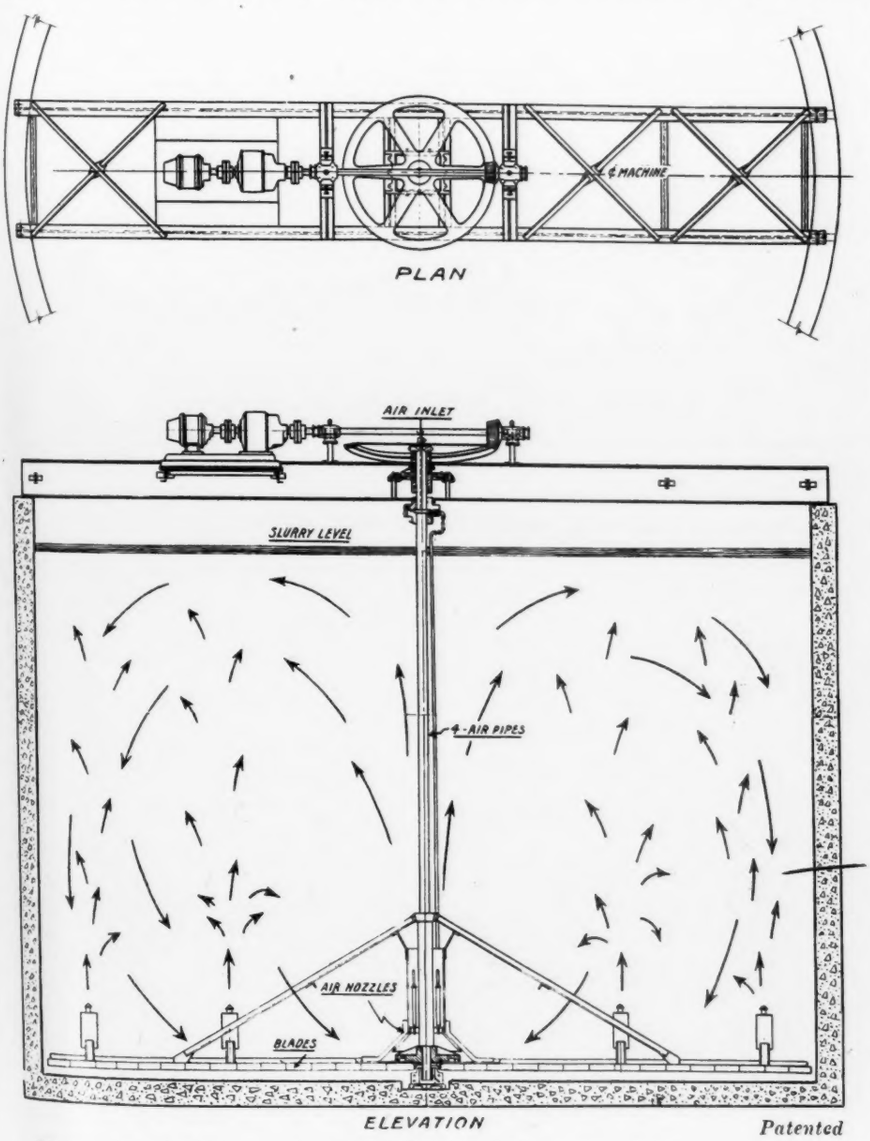
A modern cement mill laboratory of the type which now governs the whole process of making cement from the quarry to the finished product

be run to a correction tank in order that the resulting mixture may have exactly the predetermined chemical composition which is correct for kiln feed. If these various slurries are run into the correction tank one by one and the mechanical mixer started, it will be true that very little mixing in a vertical plane takes place. Samples taken at various depths will have different chemical compositions proving without a doubt that horizontal stratification exists. Furthermore, the viscosity of the slurry is such that, unless abnormally high speeds are practised, the entire tank contents will tend to rotate with the paddles. Although the high density of cement slurry does tend to buoy up any coarse material, nevertheless a deposition does take place on the bottom of the tank which in time builds up to proportions which not only endanger the machine mechanically, but also render inaccurate any capacity calculations based upon tank depth.



The modern slurry mixing system at the plant of the Valley Forge Cement Co.

The mixer shown in the accompanying illustration has been developed especially for the mixing of cement slurry. Into its design has gone considerable study along the following lines, in view of the fact that the most difficulty has arisen in the past from these sources: (1) Mixing in two planes (horizontal and vertical); (2) Positive return of deposited solids to suspension in the slurry; (3) Effective agitation over complete area of tank; (4) Reliable air agitation without difficulty from fouled nozzles; (5) Low power consumption.



Diagramatic sketch of a mixer particularly developed for mixing cement slurry, illustrating the air action

In the development of this slurry mixer it was recognized at the outset that correct agitation could not be secured by either mechanical agitation alone in the horizontal plane or by air agitation alone in the vertical plane. A violent swirling of the tank contents by mechanical agitation does not break up horizontal stratification and furthermore is not conducive to low power requirements. Air jets in the bottom are only effective when closely spaced, for otherwise deposition of solids between nozzles occurs. A multiplicity of nozzles, practically studding the tank bottom, is however not an economic solution, for the quality of the mix is not justified in any sense by the cost of the large amount of compressed air which is required in this case. In the device illustrated, the compressed air nozzles are placed on the slowly revolving (2 r.p.m.) agitator arms.

In combining air and mechanical agitation in a single machine most of the faults of each system were eliminated. The resulting combination of the two methods gave a flexible unit which gave mixes varying less than 0.2% in $CaCO_3$ content in various parts of the tank with a total power and air cost less than that with a similar size slurry mixer either air or paddle agitation alone.

Importance of Compressed-Air Element

Proper distribution of compressed air is an essential of good slurry mixing. The problem which has been the most difficult to solve has been that of nozzle design. Nozzles that are entirely satisfactory in the usual run of metallurgical and chemical pulps fail completely in cement slurry, where the mate-

rial cakes in the pipes and nozzle openings after a short time. Check valves of various types have been tried without any degree of success. A device which appeared to have possibilities consisted of a short length of perforated pipe with one end sealed and provided with a section of flexible rubber tubing, which expanded and allowed air to pass, when pressure was applied on the inside, but immediately closed the perforations by contraction and slurry pressure whenever the air was cut off. While a distinct improvement, this design has more recently been superseded by a unique design which has proved to be perfectly simple and reliable under every conceivable plant condition.

A New Kind of Air Nozzle

An entirely new principle has been utilized to prevent the solids from entering the air piping or nozzle structure regardless of the length of time during which the air is shut off. When the compressed air is turned on again after a shutdown, those solids which have accumulated and which formerly caused trouble from clogged pipe lines are immediately blown off effectively and the resumption of operation is attended by none of those difficulties which used to be inherent in slurry mixers of the air agitating type.

Tests have been conducted at a number of different cement plants in order to establish definite data on such important points as time required for complete mixing, amount of air needed for a given size tank, power required to drive a certain size mechanism, and the necessary air pressure for any given slurry depth and slurry density. The tables which follow give some pertinent facts on slurry agitation which may be relied upon with confidence since they were all obtained at regular full scale installations in normal operation.

The third table gives the results of a test of an agitator at the Independence mill of the Portland Gold Mining Co. to determine the uniformity of the mixture at different points in the tank. This is more dilute than cement slurry and is relatively coarse (56% through 200-mesh) compared with cement practice. Undoubtedly it would be classed as a more segregating material than cement slurry.

TABLE I—TIME REQUIRED TO MIX TWO DIFFERENT SLURRIES TO HOMOGENEITY

Test 1

18 ft. dia. x 13 ft. deep slurry mixer.
8 ft. of 75.65% $CaCO_3$ slurry added from tank No. 1.
3 ft. of 84% $CaCO_3$ slurry added from tank No. 2.
Agitation started with minimum amount of air (22 cu. ft. free air per min.) and grab samples taken every five minutes until homogeneity is reached with the following results:

Time, a.m.	$CaCO_3$ Content	Time, a.m.	$CaCO_3$ Content	Time, a.m.	$CaCO_3$ Content
9:42	76.5 %	10:11	77.18%	10:41	77.36%
9:51	76.5	10:16	77.66	10:46	77.06
9:56	75.76	10:21	76.72	10:52	77.90
10:01	76.26	10:26	76.61	10:56	77.90
10:06	77.90	10:31	77.36	11:15	77.78

Conclusion: 1½ hours required for mixing at minimum agitation.

Test No. 2

18 ft. x 13 ft. slurry mixer.
6 ft. of 84.20% $CaCO_3$ slurry added from tank No. 4.
5 ft. of 74.03% $CaCO_3$ slurry added from tank No. 5.
Agitation started with maximum amount of air (74 cu. ft. of free air per min.) and grab samples taken every five minutes until homogeneity is reached with the following results:

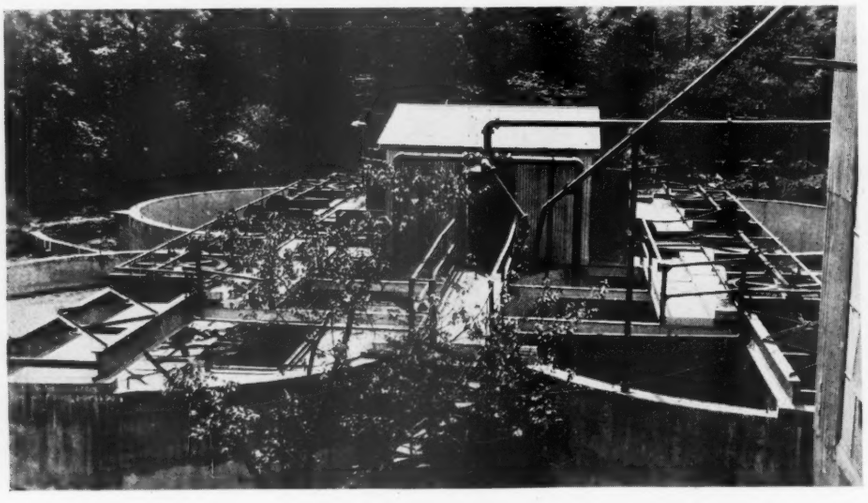
Time, p.m.	$CaCO_3$ Content	Time, p.m.	$CaCO_3$ Content	Time, p.m.	$CaCO_3$ Content
3:12	80.06%	3:35	80.29%	3:55	79.33%
3:20	74.34	3:40	78.25	4:00	79.33
3:25	74.22	3:45	79.10	.....	.....
3:30	76.50	3:50	79.20	.....	.....

Conclusion: 40 min. required for mixing at maximum agitation.

TABLE II—OPERATING DATA AT SEVERAL SLURRY MIXER INSTALLATIONS

Size of tank	Slurry depth	Power consumption	Air pressure	Cu. ft. free air per min.	Power to compress air 50% efficiency	Total power for mixing and air compression	Total h.p. per 1000 cu. ft. slurry capacity	Hydrostatic slurry pressure, h.p.	Ratio air pressure to slurry pressure, h.p.
16x22 ft.	20 ft.	1½ h.p.	25 lb.	30	4.45	5.95 h.p.	1.47	13.9	1.80
18x13 ft.	11 ft.	1¼ h.p.	12 lb.	26	2.32	3.57 h.p.	1.28	7.65	1.57
20x22 ft.	20 ft.	2.33 h.p.	22½ lb.	27	3.20	5.53 h.p.	0.89	13.9	1.62
30x20 ft.	18 ft.	3.50 h.p.	25 lb.	40	5.95	9.45 h.p.	0.743	12.5	2.0
34x21 ft.	19 ft.	4.00 h.p.	25 lb.	40	5.95	9.95 h.p.	0.860	13.2	2.0

Conclusions—(1) Power for mechanism rotation and air compression range from .75 to 1.50 h.p. per 1000 cu. ft. of slurry tank capacity, the higher unit power consumption being required for the smaller tanks and vice versa. (2) Air pressure required is approximately twice hydrostatic slurry pressure.



Four 36x30-ft. slurry storage tanks at the West Penn. Cement Co. plant at Butler, Penn.

Not Enough Attention Paid to Quality Control

It has been estimated that at the average cement mill with a payroll of 200 men, at least six men are engaged exclusively in testing. Expressed in another way, it is safe to say that the average cost of chemical control and laboratory supervision amounts to about 1 c. per barrel of finished cement. This is a very reasonable outlay for the sake of quality, uniformity and ultimate consumer satisfaction, bearing in mind that the chemical elements combine in fixed proportions when burned in the kilns and that this essential chemical composition does not result in the highest quality clinker unless the predetermined ratio of lime to silica, iron and alumina is religiously maintained by the chemical staff. Effective slurry mixing does not give this control, but it does assure a uniform kiln feed and does render the

TABLE III—SCREEN ANALYSES AND MOISTURE DETERMINATION ON CONTENTS OF 40 FT. DIA. X 25 FT. DEEP AGITATOR

	% Moisture	Per Cent Retained on Following Screens +35	+48	+65	+100	+200	—200
Point *A*	52.6	0.25	0.75	4.50	11.65	27.20	56.45
B	52.9	0.20	1.00	4.40	11.70	26.70	54.40
C	53.3	0.25	0.85	4.40	11.50	27.10	56.50
D	52.8	0.15	1.00	4.30	11.50	26.60	56.90
E	53.0	0.20	0.85	4.40	11.60	27.50	56.00
F	53.2	0.30	1.00	4.40	11.35	26.85	56.85

Points *A, B* and *C* were 5 ft. below the slurry level and distant from the side 5 ft, 10 ft. and 15 ft., respectively. Points *D, E* and *F* were 10 ft. below the slurry level and distant from the side of the tank 5 ft., 10 ft. and 15 ft., respectively.

chemist's grab samples representative of the composition of the slurry tanks contents as a whole.

Talc and Soapstone Production in Canada in 1927

TALC AND SOAPSTONE PRODUCTION in Canada during 1927 amounted to 16,521 tons, valued at $236,105, according to finally revised statistics just issued by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa. In 1926 shipments were recorded at 15,767 tons, worth $217,195.

Ontario's production was made up of talc obtained from deposits near Madoc, Hastings county, and soapstone from the Grave mine near Vermilion Bay. Quebec shipments were from quarries in Broughton, Leeds and Thetford townships and consisted principally of soapstone blocks for use in lining the alkali recovery furnaces of sulphate pulp mills. Small shipments of talc were made from two deposits in British Columbia, one located on Vancouver Island and the other near Wilmer, Windermere mining division.

Talc or soapstone, ground or unground, imported into Canada during 1927 amounted to 4907 tons appraised at $88,858. Exports of refined talc totaled 10,692 tons, worth $125,123.

Capital employed by the six firms operating in the talc and soapstone industry was recorded at $715,439. Employment was furnished 13 salaried employes and 109 wage earners; their total earnings were $87,721. Fuel and electricity used during the year accounted for an expenditure of $25,169.

Feldspar in 1927

THE crude feldspar sold or used by producers in the United States in 1927 amounted to about 202,497 long tone, valued at $1,424,755, or $7.04 a ton, according to reports obtained directly from producers by the United States Bureau of Mines, Department of Commerce, in co-operation with the geological surveys of Maryland, New York, North Carolina and Virginia. These figures show a decrease of 4% in quantity and 11% in total value compared with 1926. Feldspar was mined and sold in 1927 in 12 states, namely, Arizona, California, Colorado, Connecticut, Maine, Maryland, New Hampshire, New York, North Carolina, Pennsylvania, South Dakota and Virginia. The greatest feldspar-producing region is that which includes the Atlantic seaboard states, from Maine to North Carolina. This region reported about 94% of the total production and value in 1927. North Carolina, the leading state, reported about 50% of the total output; Maine, the second state, reported nearly 17%, and New Hampshire, the third state, nearly 14%. The average value per long ton in North Carolina was $6.08; in Maine, $8.72, and in New Hampshire, $8.13.

Feldspar Grinding

Except for minor purposes, feldspar is prepared for use by grinding. This work is done principally by commercial mills; only a very small portion is ground by users in their own mills. In 1927 there were 32 commercial mills operated in 13 states, namely, California, Colorado, Connecticut, Illinois, Maine, Maryland, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania and Tennessee. These mills reported 223,915 short tons of ground feldspar sold in 1927, valued at $3,564,141, or $15.92 a ton, compared with 225,362 tons, valued at $3,775,797, or $16.75 a ton, in 1926, a decrease of less than 1% in quantity and 6% in value. Of the quantity sold in 1927, 194,672 short tons, valued at $2,946,153, or $15.13 a ton, was domestic feldspar, and 29,243 tons, valued at $617,987, or $21.13 a ton, was imported feldspar, including Cornwall stone. Imported feldspar was ground in two states in 1927—New York and Ohio. These figures represent an increase in imported feldspar as compared with 1926.

The production of crude feldspar by states in 1926 and 1927 is shown in the following table:

CRUDE FELDSPAR SOLD OR USED BY PRODUCERS IN THE UNITED STATES IN 1926 AND 1927

State	Long tons—1926—Value*		Long tons—1927—Value*	
Arizona	†	†	†	†
California	6,271	$ 49,300	5,260	$ 43,329
Colorado	†	†	†	†
Connecticut	11,436	87,844	6,123	43,319
Maine	33,897	306,695	34,328	299,386
Maryland	†	†	2,001	11,612
New Hampshire	33,271	287,596	27,449	223,077
New York	15,517	157,865	12,020	96,446
North Carolina	91,433	602,020	100,756	612,214
Pennsylvania	1,484	4,492	3,938	24,257
South Dakota	†	†	†	†
Virginia	†	†	†	†
Undistributed	16,680	111,289	10,622	71,115
	209,989	$1,607,101	202,497	$1,424,755

*Value at mine or nearest shipping point. †Included under "Undistributed."

Fuel Consumption by the World's Cement Industry

AMONG THE PAPERS presented at the Fuel Conference organized by the British National Committee with the approval of the World Power Conference in London, during the latter part of September, was a paper on "The Fuel Question in the Cement Industry" by O. V. Morch, who considers that the competition in ideas resulting from the controversy on the wet and dry methods of making portland cement in rotary kilns has benefited the industry and increased the efficient use of coal, coal representing more than half the prime cost of the cement. Since powdered fuel was first used in rotary kilns in 1900, and since for dry kilns the high temperature exit gases were used in waste-heat boilers to provide steam for all or most of the power used in cement works, the efficiency in terms of the ideal kiln has nearly doubled. As the demand for better cement grows, more and more power will be required, especially for fine grinding. The author estimates the world's use of fuel for the annual production of 59,000,000 metric tons of cement at 24,220,000 metric tons of fuel—coal, coke, lignite, peat and oil. He considers it not impossible to still save 5,000,000 metric tons of this fuel annually.

Fuels and Fuel Testing

THE investigations conducted by the staff of the Division of Fuels and Fuel Testing, Canadian Department of Mines, conducted in 1926, are reported in two parts, both published in Bulletin No. 689 of the Department of Mines, Ottawa, entitled "Investigations of Fuels and Fuel Testing."

Part I contains reports of investigations on low temperature carbonization of bituminous coals, the nature of sulphur in coal and coke and on drying and moisture reabsorption of lignite. Part II contains, in addition to the annual gasoline survey, papers on the treatment of crude shale oil from New Brunswick oil shales and on bitumen emulsion obtained from Alberta bituminous sands for the production of fuel oil.

The Universal Oil Products Co. of Chicago and the Kansas City Testing Laboratory assisted the Dominion staff in some of the investigations.

Quarry Industry in North Carolina

Probably Has Greatest Variety of Stone of Any State in the Union

By H. J. Bryson
State Geologist, Raleigh, N. C.

THERE IS PROBABLY NO STATE in the Union which has a greater variety of stone than North Carolina. The state has practically every type of building, structural, monumental and ornamental stone to be found. The types of stone found are the white, pink and gray granites; the stone allied to granite, as rhyolite, diorite, trap, etc.; several varieties of gneiss; white, "Confederate gray," pink, mottled, "regal blue" and black marble; several varieties of limestone and dolomite; quartzite; gray and red sandstone; serpentine and verdantigue marbles; and volcanic slates.

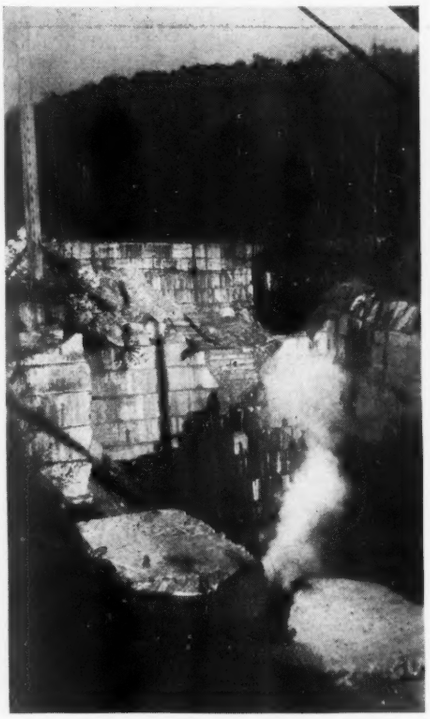
Granites

The granites of North Carolina are distributed over about one-half the total area of the state, but the productive part of this area is considerably less. Openings from which granite has been quarried in the past have been made in a majority of the counties where it occurs. The chief producing centers at the present time are in the counties of Rowan, Surry and Vance. In Rowan county, the "Salisbury pink" is produced. In Surry, the "Mt. Airy" granite is the chief variety found. These two varieties of stone are well known throughout the eastern United States.

Geographically, the distribution of the granites, gneisses and allied stone is in the three larger physiographic provinces of the state, namely, the Coastal Plain, the Piedmont Plateau and the Appalachian Mountains. However, the largest part of the granites are comprised within the limits of the Piedmont Plateau region. Smaller workable areas of massive granites, usually of excellent grade, are distributed through a number of the counties of the inner margin of the Coastal Plain, especially in the counties of Nash, Wilson, Johnston and Wake. The large areas of granite rocks of the mountain region are usually schistose in structure and cannot be used for certain high grades of work in which the granites are used.

The granites of the Coastal Plain area are the massive biotite rocks varying from fine even-granular to coarse porphyritic in texture and from gray to pink in color. Usually jointing is rather well developed in the granites, intersecting the rock in several general directions. Due to this excessive jointing very few quarries have been opened from which large blocks of structural stone have been produced; consequently most of it is used in the crushed form.

In the Piedmont section the texture of the granites varies from fine to medium, rarely coarse, and the color from nearly white through the lighter to darker shades of gray. A very beautiful shade of pink granite is quarried in several places in the vicinity of Salisbury. Over most of this area the granite shows more or less distinct evidence of the effects of intense dynamic-metamorphism.



A quarry of regal blue marble in the western part of the state, where recent developments have shown tremendous supplies of this stone

In the mountain region the granites, both massive and schistose in structure, are quite widely distributed. More often they are schistose in structure and are usually biotite-bearing. The gneisses are of both sedimentary and igneous origin. In addition to the acid rocks, massive and schistose basic igneous rocks are found in places over the entire region. At times these rocks are found in large enough quantity and of such character as to make them of value for certain uses.

Marble

The marble deposits occur chiefly in Macon, McDowell, and Cherokee counties in the extreme southwest corner of the state. It occurs in a sort of lens varying in width from 1000 to 2500 ft. and extends for a distance of 23 miles. Within the past year considerable core drilling near the center of the deposit has been done by a newly organized company which expects to develop the marble on a large scale. Before drilling was started it was thought by all who had visited the district that the marble was too much jointed to be of value as a building stone. However, the drilling revealed that little jointing occurred on the north side of the deposit. In the blue variety, blocks 28 ft. thick without a flaw were found. In the white, blocks 17 ft. thick were revealed.

Recent tests prove that the marble ranks among the best found in America. The tensile and compression strengths are high while the absorption is very low. Due to the low absorption qualities the marble is practically unstainable. Tests revealed that oils, greases, and organic juices did not penetrate the surface. As a result such materials, even after several days exposure, could be removed with little effort. A number of tests made by the Bureau of Standards and the Massachusetts Institute of Technology on the fine grained white variety proved that it ranked with the Carrara marble for most uses.

Limestone

Many varieties of limestone occur distributed over the state. In the eastern or coastal plain area a great number of deposits of marl, shell-rock and limestone occur. These materials are used at present principally for lime purposes, but a $3,000,000 portland cement plant is under consideration by a large northern company to utilize the high grade material for cement. The deposits under consideration for development occur chiefly in the vicinity of New Bern. The true limestones occur in Swain, Henderson, McDowell and Madison Counties. Four plants are in operation at the present time producing crushed stone, lime and hydrated lime.

Quartzite

A lens of quartzite occurs in the Ocoee formations in the extreme eastern part of the state and extends for a distance of several miles in a northeast-southwest direction. Some of it, after crushing, has been used as sand as well as for a fluxing material in the copper smelters of eastern Tennessee. However, at places, it is pure enough to be

Quarry of pink and white granite at Granite, N. C., illustrating the operating methods in use

used in the ceramic trade to some extent.

Sandstone

There are two areas in the state where sandstone is found which has been used for a building stone. The first area is in Stokes and Rockingham counties in the north-central part of the state. This area is about 10 miles wide and extends northeastward into Virginia. The second and largest sandstone area is in the south-central part of the state, varying from 5 to 18 miles in width and is about 100 miles long. At a great number of places throughout this area are old quarries which were operated years ago. The chief producing center was in the vicinity of Sanford. A great deal of the stone used in the old buildings of the State University at Chapel Hill came from this sandstone belt. Both of these sandstone areas are of Triassic age.

Serpentine

The distribution of the available serpentine in the state is limited principally to the counties of Buncombe, Caldwell, Madison, Watauga, Wake, Wilkes and Yancey. It occurs in small quantities in a great number of the mountain counties, but as a rule the deposits are small and the color not suitable for ornamental purposes. In all of the places where the serpentine is found the stone occurs in dikes most of which are narrow but sometimes extend for great distances. The material found thus far is almost invariably of a dull dark green color, though sometimes a light yellowish green material is found. It always contains an abundance of dark granules and veinlets of chromic iron ore but so far as has been observed this does not injure the stone for general purposes.

Volcanic Slates

The volcanic slates are confined chiefly to the south central counties. None of these slates, however, have been mined as such. The chief use so far has been for making brick. The material, when finely ground, is especially suitable for high grade flashed face brick.

STONE PRODUCTION IN NORTH CAROLINA FROM 1924 TO 1927 INCLUSIVE

Year	Value
1924	$3,338,205
1925	3,690,506
1926	4,285,875
1927	4,967,542

The table above shows a steady increase in the production of stone in this state during the past four-year period.

Feldspar in Ontario and Quebec

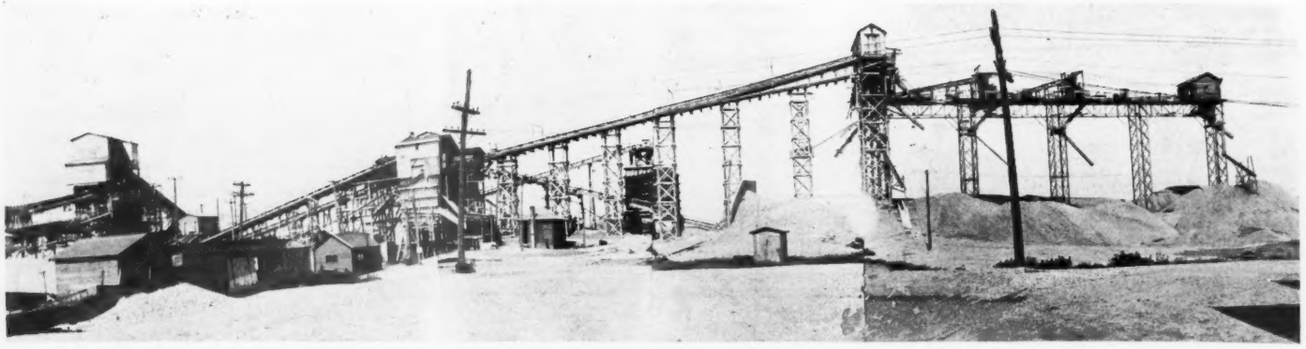
MANY important deposits of feldspar, in the form of pegmatite dykes, occur in the region of Grenville-Hastings strata extending eastward from Georgian bay through Ontario and into Quebec north of Ottawa and St. Lawrence rivers. In 1923 nearly 30,000 tons of feldspar were produced, mostly from deposits in districts to the north and northwest of Kingston, in Ontario, and along lower Ottawa river, in Quebec. The deposits occur in pegmatite dykes cutting various types of gneisses, schists and less deformed sedimentary and igneous rocks. The feldspar is commonly a reddish potash feldspar, but in some instances the deposits are of pale cream or nearly white potash feldspar, as in the case of various deposits in Derry and neighboring townships in Quebec, a few miles north of Buckingham. One of these occurrences is a dyke about 50 ft. wide which, over a width of 35 ft. and for a length of 300 ft., consists almost entirely of pale microcline with scarcely any hornblende, mica, etc., and with only minor amounts of quartz lying in aggregates between large feldspar crystals.

One of the largest feldspar bodies is the Richardson mine, situated 25 miles north of Kingston. The deposit lies in a steeply inclined dyke 150 ft. wide and cutting biotite gneiss. Over a length of more than 400 ft. the dyke consists mainly of microcline, but with, towards the center, a large mass of quartz. Near the edge of the dyke, crystals of hornblende are scattered through the feldspar mass, and there are narrow zones of a soda-feldspar.

In most cases the feldspars of the pegmatite dykes are not segregated in such large masses as in the instance cited, but occur intergrown or intermixed with quartz, mica and other constituents of the rock. In some instances, as at the Villeneuve mine, 20 miles north of Buckingham, a dyke has been exploited for both its mica (muscovite) and feldspar contents.

At this locality a series of white pegmatite dykes cut a fine-grained gneiss. One of the dykes is 150 ft. wide and has been quarried. The rock consists mainly of white microcline and albite intimately associated, but accompanied by quartz, muscovite in large crystals and a number of other minerals.

A shale pit at Norwood, N. C., showing the marked dip of the strata



General view of the Ward plant at Oxford, Mich., with the crushing and screening plants at the left and the storage equipment at the right

The Ward Sand and Gravel Company Operation at Oxford, Michigan

A Pumping Plant Without Precedent

INNOVATIONS in any industry are always received with skepticism, and, if the innovations are unusually novel, with a good deal of adverse criticsm and unbelief. In the sand and gravel industry no innovation has caused quite so much comment and criticism as the system of pumping designed by F. L. Ward and applied by him to the big sand and gravel production which his company, the Ward Sand and Gravel Co., has carried on at Oxford, Mich., for some years.

Consequently when a ROCK PRODUCTS editor visited the plant recently he was even more interested in the economics of the production than the engineering feature. For the sand and gravel business is like any other business in that it must first of all show a profit on its operations. If an innovation helps it to increase its profits by lowering the cost of operation it is a success whether it falls in line with the ordinary views of what is good engineering or not.

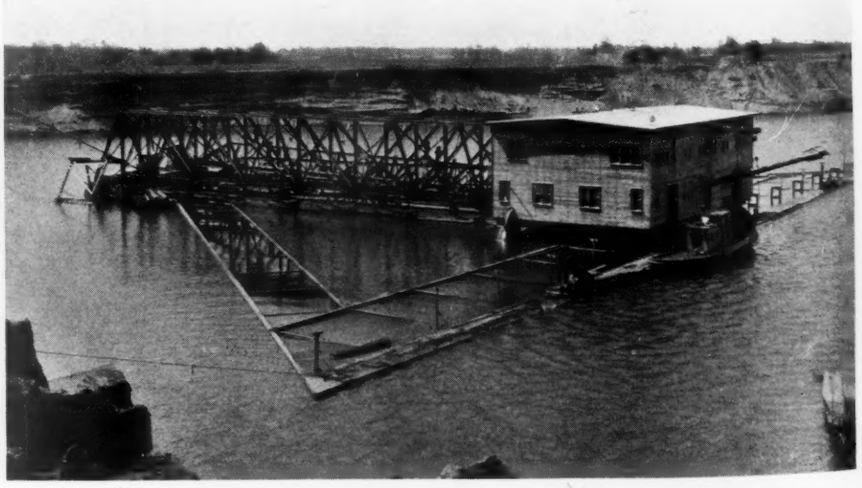
The figures can speak for themselves. When this article was being prepared Mr. Ward gave the writer access to his shipping records and power bills and furnished all other information that was requested, and the figures that follow came from these sources.

The new dredge, which represents the latest development of the Ward system (with two jets) was placed in service in April, 1928. As the plant was visited in the early part of June, the record of May was the only one showing a full month's production. In May the production was 218,881 tons, for May was a short month with four Sundays and a holiday, and some time was lost for which the dredge was not responsible. The production was 9120 tons per working day.

The records of the time of filling barges are carefully kept and they show that on an average 31 min. were required to load a barge and that the average load was 531.7 tons. This is equivalent to 1003 tons per hour and only one jet was used at a time, changing from one yet an the other whenever a big stone had to be removed from the mouth of the suction, in the way that will be described later.

The power bill for the entire plant for the month of May was $8010.44. Not all of this went to the dredge by any means, as the description which follows will show. There is a heavy cost for transporting the material, pumping water and doing other things about the plant. Power has not been accurately allocated to the different operations, but it has been so sufficiently to show that not over 70% of the total power bill should be charged to the dredge. Since 70% of $8010.44 is $5607.31, that is the power cost for pumping 218,881 tons, the cost per ton being 2.56 c.

While cheaper power costs may have been obtained in some fields for the same lift, Mr. Ward says that his power bill is considerably less than it was when he used centrifugal pumps. The great gain, however, has been in the lessened cost of wearing parts. When pumps were used runners had to be replaced every two weeks to keep up the efficiency of the pump, and a runner is expensive, and it takes some time to replace one. In addition to the wear on runners there was the wear on plates and shells to be taken into account. With the present system wear is practically confined to the



The new dredge of the Ward Sand and Gravel Co. at Oxford

The original dredge using the Ward system. This outfit pumped an average of 244 cars per day

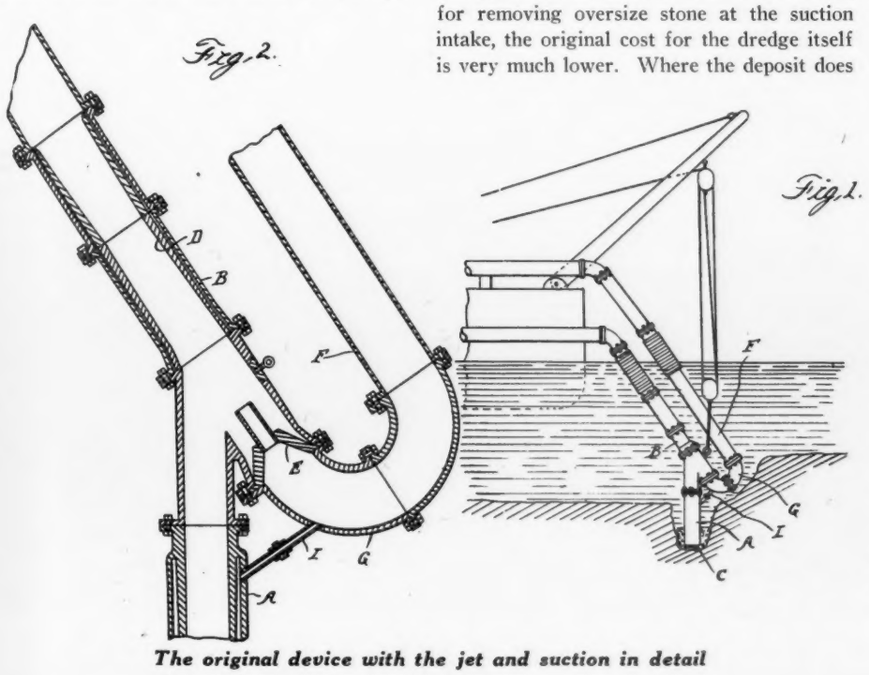
The new dredge at the Ward plant, showing the pair of discharge pipes

throat piece, or "venturi," which is not expensive and which is easily changed. It has never taken more than two hours to make the change from stop to start. Usually it is made in less time.

The Ward system is an application of the hydraulic elevator or hydraulic ejector, a device which has been shunned by engineers because of its low efficiency. Mr. Ward admits that the efficiency of his device is low, taking the power input from the instruments on the board and comparing it with the work done in foot-pounds in lifting sand, gravel and water. But the useful efficiency of the device is high because of the high percentage of solids in the discharge, which is around 40%. While the foot-pounds efficiency is low, less power is wasted in lifting water which is not wanted, than with a centrifugal pump.

The figures given the writer at another plant would indicate that about 14% of solids are carried in the average centrifugal pump discharge in this field. Jets are used instead of cutters and it is the opinion of operators that this percentage of solids could be profitably increased by the use of cutters. One company was installing a cutter when this article was prepared. But without the cutter it appears that six tons of water are lifted with every ton of solids by the centrifugal pumps of the district, while the Ward system lifts only 1½ tons of water for every ton of solids.

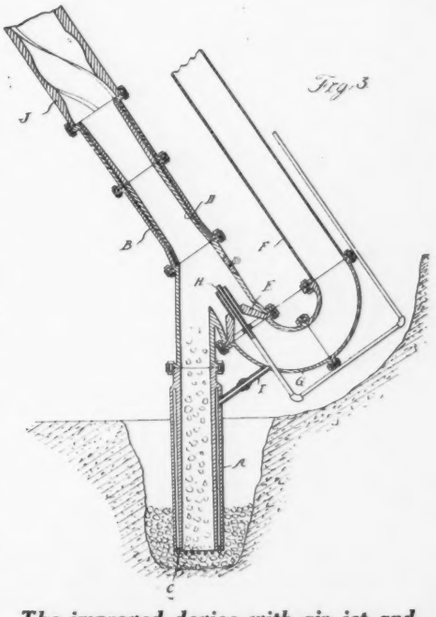
The specific claims made by Mr. Ward for his device are: "A more continuous production, as major accidents are practically eliminated. It takes less skill to operate, as it is not possible to plug the discharge pipe. Larger material can be handled with a unit that compares with the same size suction dredge, for the reason that restricted areas in the dredging apparatus are larger. Lower cost per ton for labor than the ordinary type of suction dredge, and with the exception of a dredge without cutterhead or other method for removing oversize stone at the suction intake, the original cost for the dredge itself is very much lower. Where the deposit does not contain stone over 6 in. in diameter, the efficiency of the dredge is greatly increased, due to the fact that the restricted areas can be decreased so as to take better advantage of the power used."



The original device with the jet and suction in detail

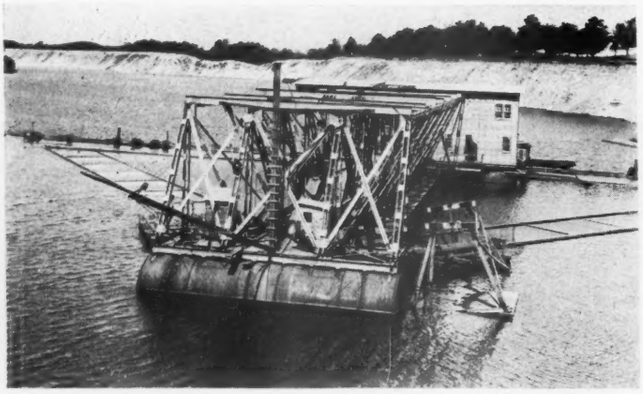
The New Dredge

The device and its operation has been described in Rock Products (in the Annual Review number for 1925 and the issue for May 12, 1928) so space will not be given to the theory involved. It was originally applied to a dredge with a 15-in. pipe, which is shown in one of the accompanying pictures. The discharge from this was boosted on the shore to the plant by another jet or hydraulic elevator and the combination made a very satisfactory production record. For the seven months it was operated the average shipments were 244 cars per day, all produced by this dredge.



The improved device with air jet and with water jets on the suction

One of the outline cuts shows the suction



The end of the truss supporting the suctions. Note the small sluicing pipe in the front

The truss between the dredge and the pontoons which supports the large suction pipes

and the jet with the connecting water pipe and U turn. On the new dredge there are two of these and the pipes which connect them to the dredge are 115 ft. long. The dredge can dig in 110 ft. of water, but it works most of the time at 70 ft. to 75 ft.

Part of the pressure water is sent to nozzles around the suction and a 2-in. pipe beside the suction which helps it to sink. Pressure water is supplied to a 2½-in. pipe with a 1-in. nozzle, which is used to cut down the bank, by the priming pump.

One suction pipe raised showing the "U" turn

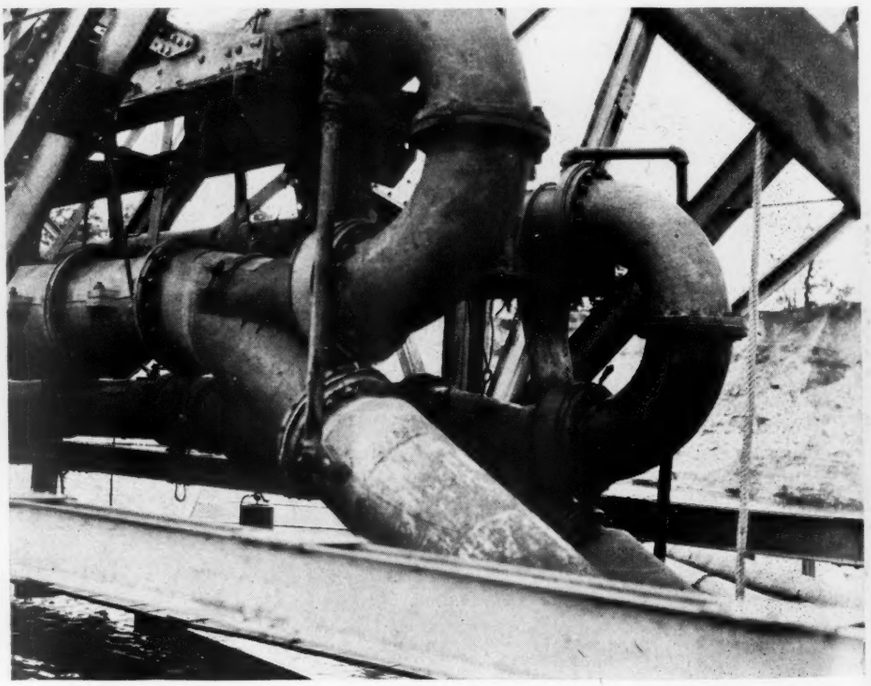
The pipes are 18 in. in diameter and each is supported by a truss which is raised and lowered by wire cables that pass through sheave blocks. There are two sets of blocks, as the suction is long enough to need support in two places. The whole is carried by a trussed bridge of structural steel, one end resting on the dredge, the other on pontoons. The booms which support the suction pipe also support the 15-in. pressure pipe.

The dredge itself is a two-story structure of steel frame covered with wooden siding. On the lower floor are the pumps for the two jets. One is an older set, which is mainly held as a reserve. It contains three Allis-Chalmers 12x14-in. pumps in series, each direct connected to an Allis-Chalmers 400-hp. induction motor. The other set, which was especially designed by Allis-Chalmers engineers for this work, contains two 12x14-in. pressure pumps connected to 550-hp. synchronous motors. This is a more efficient set than the first mentioned, as regards both pumps and motors. The efficiency of the pumps is 86% at 220-lb. pressure and the motors, of course, are of the most efficient type made. On the same floor and near the pumps are the auto-transformers used in starting the synchronous motors and the exciters.

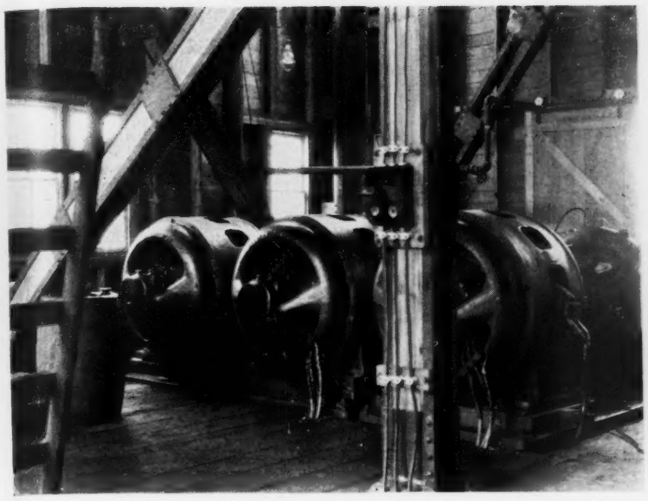
These motors start with a push button, automatic contactors on the board building up the speed. The board is of Westinghouse make and it is placed on the second floor. On the lower floor between the two pumping units is the priming pump, a 6-in. Morris pump with a 100-hp. General Electric motor.

On the second floor are the hoists for handling the dredge and the barges. The main hoist which handles the suctions is a three-drum Thomas hoist with a 90-hp. motor. At one side is a two drum Thomas hoist with a 25-hp. motor and silent chain drives that handles the head line by which the dredge is moved and also held in place. Another hoist of the same make with a 12½-hp. motor handles the stone car.

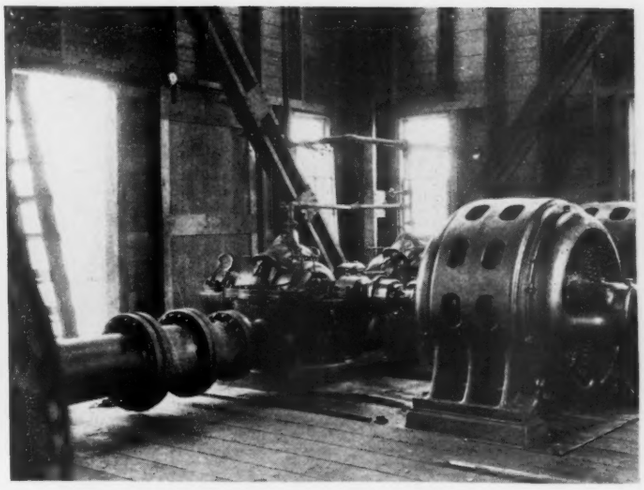
This stone car is an ingenious device for removing large stones from the mouth of the suction pipe. It is a frame about 20 ft.



The ends of the two suction pipes showing the "U" turn arrangement and small jet pipes



Three 400-h.p., reserve motors driving three pumps in series



Two 4000 g.p.m. pumps in series driven by two 550-hp. motors

long supported from car wheels that run on a track on the upper part of the truss that carries the suction pipe. In front is a pan about 4 ft. square. When the suction is stopped with a stone that is too large to enter the mouth, the pipe is lifted and the stone comes up with it. Then the pressure pumps are shut off and the stone drops off into the car and is brought up to the surface.

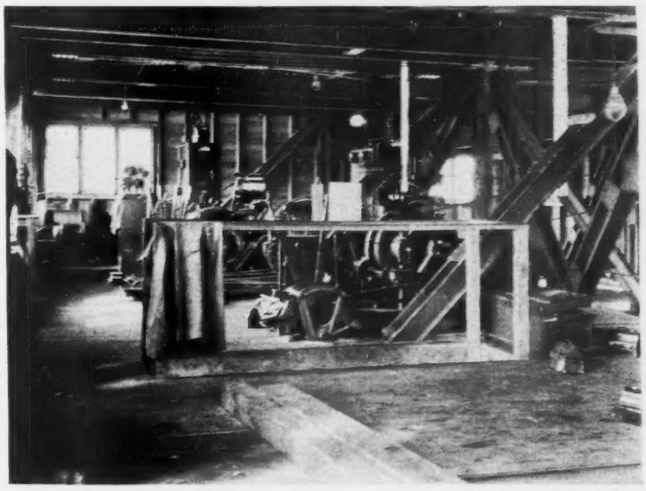
The discharge pipes are really continuations of the suction pipes, but there is a flexible joint between the two to allow the suction pipes to be raised and lowered. The fixed discharge pipes are set at about 30 deg. and project for some distance outside the dredge so that the sand and gravel may fall into the center of the barges. The ends of the pipes are about 18 ft. above the water.

The dredge house is 70x30 ft. and it rests on six tank pontoons. The pontoons for the dredge and for the barges are all the same, tanks 10 ft. in diameter and 40 ft. long. Manholes and handholes fitted with pipe plugs are fitted in all of them for pumping out or for entering to repair a leak if this should be necessary. They are made of ¼-in. steel plate with lap welded joints and slightly convexed ends.

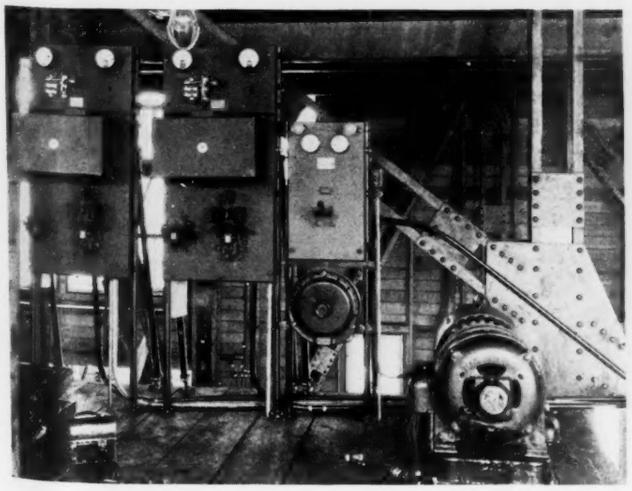
Barges

The barges used in this operation are quite as unusual as some other features. Each of the three in use has a hopper 120 ft. long and 20 ft. wide at the top, the sides sloping at 55 deg. from the horizontal. This hopper is of ¼-in. steel plate and is carried in a framework of 6-in. angle irons that rests on two sills of 12-in. I-beams. The sills are fastened to the outer rows of three rows of the standard pontoons described and these are fastened to the inner row by gusset plates which are riveted to angle irons riveted on the pontoons. These gusset plates and angles make the nine pontoons into a rigid platform.

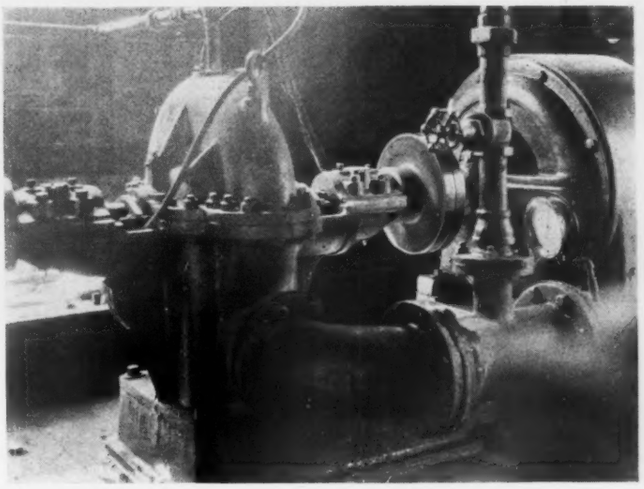
Each hopper holds from 500 to 600 tons



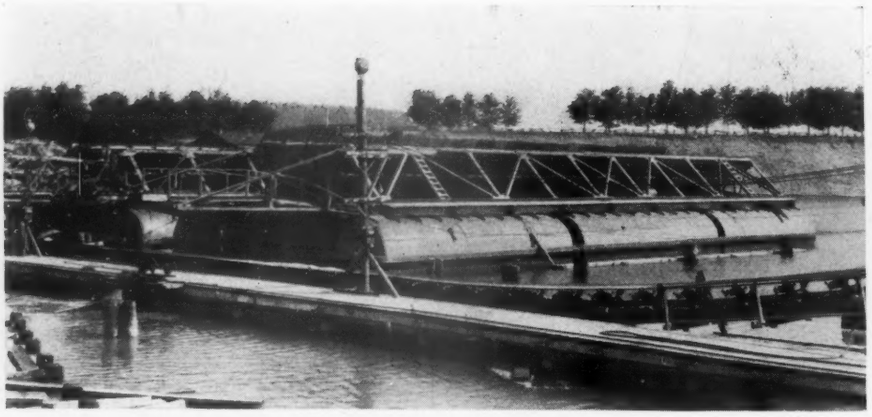
Upper floor of the dredge showing the hoists and controls



The starting panels for the synchronous motors on the dredge



The wash water pump direct connected to its motor



Self-unloading barges with pontoon supports at the Ward plant

when loaded and as fast as one is filled it is taken to the landing by one of the two tug boats in service. One of these is steam driven and the other has semi-Diesel oil engines. Steam is preferred as giving a somewhat more flexible operation with a reserve of power and a not much greater fuel cost. Both boats are 40 ft. long and of 12-ft. beam.

Where the dredge was working when this article was prepared, the distance was such that 14 minutes were required to make a tow of the barge, which kept one tug very busy. With three barges, one empty is always in passage between the dredge and the landing.

The barges are self-unloading, for there is a 30-in. conveyor under the load, the head pulley being carried on a boom that extends in front of the barge. At the landing place this pulley is connected to a 40-hp. motor and Falk speed reducer. There are 26 gates above the belt in the bottom of the barge each with its own hand wheel for opening and closing. Either two or three gates are opened at a time so as to draw the load down uniformly.

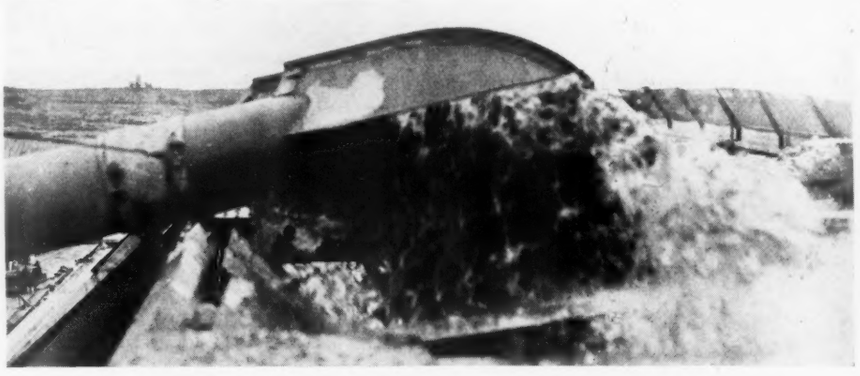
The steel work and general design of dredge and barges was by Whitehead and Cale of Detroit, Mich.

The washing and screening plant is, in effect, a long system of belt conveyors connecting the different units. It begins at the wharf where the conveyors from the barges discharge on a 36-in. belt of 200 ft. centers, the length of the dock. This rests on pontoons. A wooden shield which may be moved along to where the barge is placed receives the discharge from the barge belt and directs it to the dock belt. The dock belt is driven by a 60-hp. motor and Falk speed reducer.

This belt delivers on two belts both 36-in. wide which deliver the material to the primary crushing department. It was originally intended to have one belt in reserve, but with the heavy production since obtained both belts usually have to be run. They are of 130-ft. centers and a special method of driving was recently installed by the Link-Belt Co. The belts are driven on the under side at about the center, and they run over and under pulleys which are set near the gravity take-up. With this method of driving the wear on the belt is somewhat less, although the power consumption is the same. The drives are squirrel cage motors, one of 40-hp., the other of 60-hp., with Falk speed reducers.

The primary crusher is in a separate building. It is an 18x36-in. jaw crusher and is driven through a belt by a 75-hp. squirrel cage motor. It was made by the Iowa Manufacturing Co. After passing this the material goes to a long conveyor which takes it to the dewatering and sand separating tower. This conveyor is also doubled, both belts being 36 in. wide. They are driven by an Allis-Chalmers slip-ring motor of 100-hp and a Falk speed reducer.

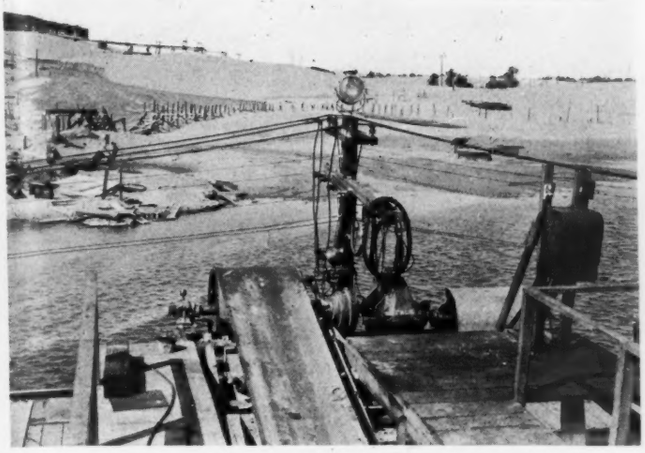
Water is added here, the supply coming from the pump house at the dock where two Allis-Chalmers 12-in. pumps in series are installed. Each is connected to a 200-hp.



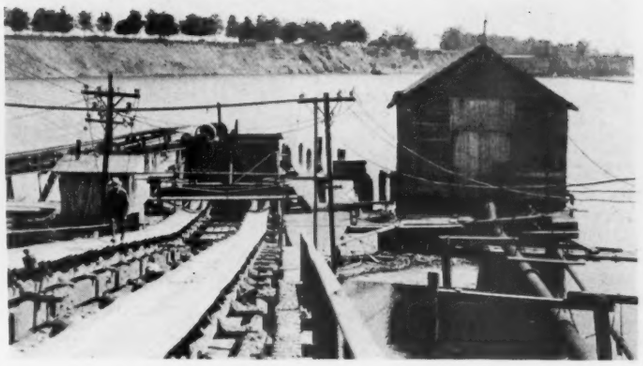
Pipes from the dredge discharging to one of the barges beside the dredge

Interior of self-unloading barge showing construction

Steam tug used for towing the barges to the plant



The end of the conveyor on one of the self-unloading barges extending out over the front of the barge



The end of the wharf conveyor at the rear with the two plant conveyors in front and the pump house to the right

motor. In the pump house, too, is a Morris 6-in. pump, which carries 100-lb. pressure. This furnishes water to the screens. A 12-in. Allis-Chalmers pump and motor is held in reserve.

Water is added at the discharge of the belt mentioned, a neat hopper arrangement preventing splashing or wetting the belt. Water and material then flow over a gravity screen with slots 3-in. long and 2½-in. wide below and 1¼-in. wide above. The widening of the slot in the direction of the flow prevents blinding and this is helped by making the screen into a succession of small steps, the plate being "kinked" at the slot. This type of screen has been in use for some years and has been satisfactory in its service.

The oversize goes over two "Hum-mer" vibrating screens covered with 2x2-in. wire cloth, and the oversize of these goes to a hopper that is above a 24-in. belt of 40-ft. centers that conveys it to the secondary crushers. It is driven by a 15-hp. Fairbanks-Morse motor through a Falk speed reducer.

The undersize (of the first gravity screen) goes to gravity screens with ⅜-in. round holes. The undersize of these goes to two sand flumes, 100 ft. long on the outside of the building. In these the sand first passes over 5/16-in. and ¼-in. screens to take out "flat sand," or pea gravel, and then is settled and drawn off by valves from which it

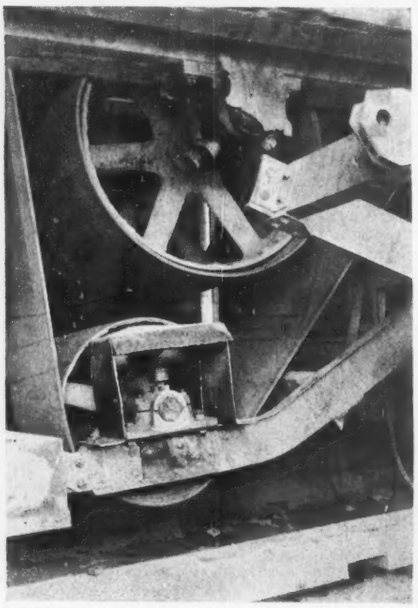
The loading bins and the first of the high towers, seen from the crushers

Looking up the pair of conveyors toward the first high tower

Two of the sand flumes in which the sand is graded

falls to the storage piles below. Baffles in the flumes regulate the size of settled sand taken off at different points. Another ⅜-in. gravity screen and flume recovers the sand from the undersize of the "Hum-mer" screens.

Each storage pile is built over a belt in a tunnel and all three belts converge at a point over the conveyor that takes material from



The drive on the under side of the main conveyor belts

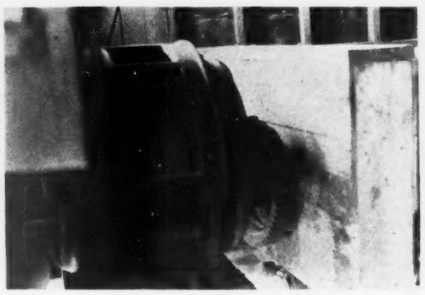
this part of the plant to the car loading bins. The belts are peculiar in their drives, the motors being direct connected to the gear shafts of the belts. All the belts are driven by 30-hp. motors and the center length of each is approximately 150 ft.

The gravel, all minus 2-in. and plus ⅜-in., falls from the gravity screens into a concrete block silo about 20 ft. high and 16 ft. in diameter. From this the gravel falls on a 30-in. belt that takes it to the top of the loading hopper. Here it is transferred to another belt of the same width that takes it to the screening plant beyond. The belt that passes under the silos comes from under the secondary crusher house so that both the crushed material and the uncrushed go as a single product to the screens.

The secondary crusher house contains four 16x20-in. jaw crushers made by the Iowa Manufacturing Co., and each is driven through a belt by a 30-hp. motor.

There are two belts running from the dewatering and screening plant just described, both 30-in. One takes the gravel, as has been mentioned, the other takes sand that is brought in by the belts under the sand storages. The sand falls into the loading bins and a gate permits it to be thrown to the bins on either side of the loading tracks.

Beside the railroad loading bins there is a 600-yd. truck loading bin which stands at one side. This is fed by a 24-in. belt from

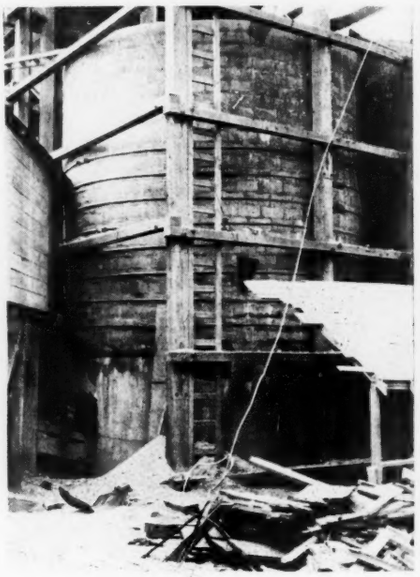


Direct drive on the conveyors under the storage

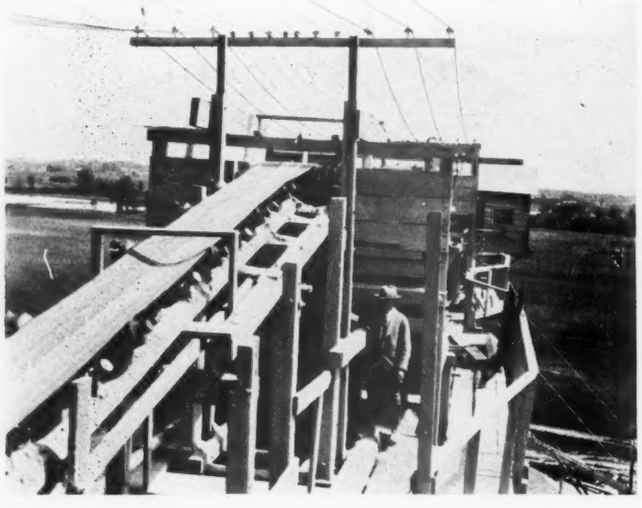
above the loading bins, about 75 ft. long, which is driven by a 15-hp. motor through a Falk speed reducer.

Two 24-in. belts, about 200 ft. long, take everything that comes from the silo and the secondary crushers to the high tower screening plant. The drives are in a house on the first tower, a 40-hp. and a 60-hp. Westinghouse motor and a Palmer-Bee and a Falk speed reducer.

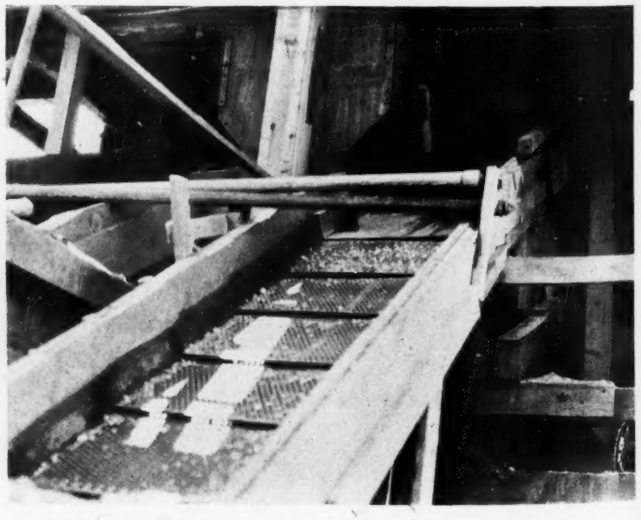
In this high tower plant there are two banks of "Hum-mer" screens which are served by a single 24-in. belt. The belt rises to a point above the screens and discharges upon the screens. Then it passes underneath the screen and receives the undersize which it takes to the next screens, receiving the undersize of these in turn. The first screens are covered with ⅝-in., the second with ⅜-in. square mesh wire cloth. All the products go to the storage piles beneath and the sizes made are: 2-in. gravel (2-in. and finer), 1-in. gravel (1¼-in. to ⅝-in.), ½-in. gravel (⅝-in. to ⅜-in.) and ballast which is ⅜-in. to ¼-in. The material is recovered by a belt in a tunnel which is about 450 ft. long that rises after it leaves the tunnel to the top of the loading bins. It is driven by a 100-hp.



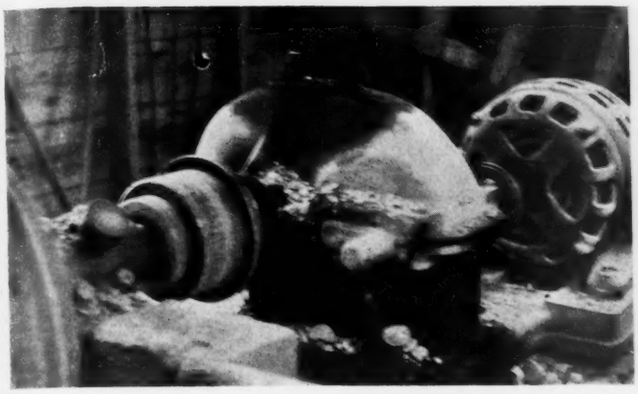
Cement block silo which receives the gravel for re-screening



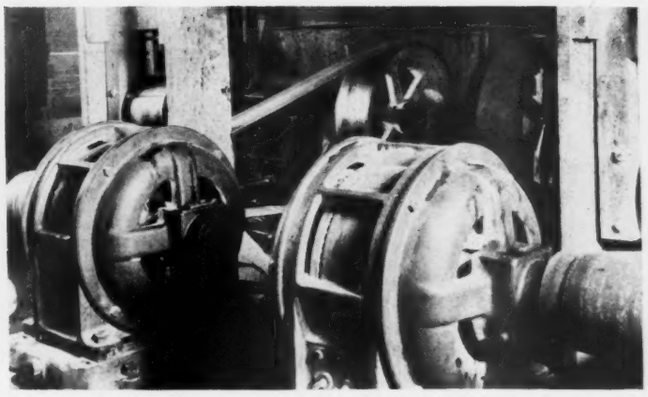
The back of the screen on the high tower, showing how the belt passes under



Vibrating screens above feeding to the gravity screens below



The motor and drive on the conveyors for the high tower screening plant



Drives on the secondary jaw crushers at the Ward plant

motor and Falk speed reducer in the room over the loading bins.

The 24-in. belt that feeds the "Hum-mer" screens is driven by a 30-hp. motor and a Palmer-Bee speed reducer. Its length is 120 ft.

All the motors in the plant, except as otherwise noted above, are of Allis-Chalmers make.

The conveyors are from various manufacturers and all of them have troughing idlers with plain cast-iron bearings lubricated with grease cups. Most of them are of Link-Belt make. The return idlers, also of Link-Belt make, are of the skeleton patterns and their use has been found to give increased life to the belts.

Power comes from the Detroit Edison Co. over a 76,000-v. line. It is transformed to 4600-v. before being delivered and the Ward company has its own transformers by which part of the current is stepped down to 220-v. before being sent to the plant.

The company has its main office at Oxford. The president and general manager is F. L. Ward and the other officers are: Vice-president, Jos. J. Kennedy, attorney, firm of Denby, Kennedy and Kennedy, Detroit, Mich.; secretary, Mrs. Mary D. Ward, Pontiac, Mich.; treasurer, Mrs. Elizabeth M. Hammond, Oxford, Mich.; plant manager, J. C. Garrels, Oxford; sales manager, L. J. Dyament, Detroit; traffic manager, H. G. Ladouceur, Oxford.

Iowa Gypsum Production Shows Steady Growth

THERE were seven gypsum companies operating in Iowa during 1927, according to figures compiled by James H. Lee, assistant state geologist of Iowa, and published in the *Dubuque* (Iowa) *Herald*. Six companies at Fort Dodge and one at Centerville operated during this period. Following are the names of the companies: Federal Gypsum Co., Centerville, Iowa; Universal Gypsum Co., Wasem Plaster Co., Cardiff Gypsum Plaster Co., Certain-teed Products Co., and the Hawkeye Gypsum Products Co.

According to figures given, the prices for crude gypsum were slightly higher for 1927 than for the previous year.

To show the yearly increase, the following table gives the value of Iowa's gypsum production for the years indicated.

1921	$2,922,700
1922	4,146,182
1923	5,368,532
1924	.....
1925	6,734,271
1926	6,588,203
1927	6,713,497

The value and tonnage of the different gypsum materials are given as follows (factory valuation):

1926	Tons	Value	Value per Ton
Crude gypsum	129,803	$ 296,854	$2.29
1927			
	Tons	Value	Value per Ton
Crude gypsum	139,637	$ 391,701	$2.80
Hardwall plasters	398,445	2,826,968	7.09
Plaster of paris—dental	6,624	51,317	7.75
Wallboard and plasterboard	104,851	2,603,155	24.93*
Partition tile	55,516	487,844	8.78*
Insulation and misc.	18,869	352,512	18.07
Total calcined	584,305	$6,321,796	$10.82

*This shows the value per ton of the finished product and not the value of the gypsum content.

Output of Masonry, Natural and Puzzolan Cements Increased in 1927

STATISTICS of hydraulic cements, other than portland cement, in 1927, which include masonry, natural and puzzolan cements, as compiled by the United States Bureau of Mines, Department of Commerce, show that the nation's production—2,123,868 bbl.—exceeded that of 1926 by about 1%. Shipments of these cements from mills in 1927 increased over 6% in quantity and over 2% in gross value. Stocks at the mills decreased and were about 19% lower at the end of 1927 than at the end of 1926.

These statistics represent the output of 11 plants, which are located as follows: One each in Alabama, Illinois, Indiana, Kansas, Kentucky, Ohio and Pennsylvania; and two each in Minnesota and New York.

The output has been expressed in terms of 376-lb. bbl. to correspond with the statistics of portland cement.

Economic Factors Involved in the Developments of New Sand and Gravel Deposits

THE SAND AND GRAVEL INDUSTRY has developed phenomenally in the past few years, according to the United States Bureau of Mines, Department of Commerce. From 1922 to 1927 the volume of production of sand and gravel in the United States increased more than 100%. A probable result of such rapid expansion in any industry is the promotion of new projects without adequate study of economic conditions. The ease with which new sand and gravel operations may be started greatly facilitates this expansion. The failure of a new enterprise means bankruptcy to the individual company, and efforts to maintain production in the face of adverse conditions usually has a demoralizing effect on the industry as a whole.

It is highly desirable therefore to place before prospective operators the various factors on which the success of a sand and gravel enterprise depends. The Bureau of Mines, through its Building Materials Section of the Rare Metals and Non-Metals Division, has undertaken the task of outlining the conditions that require study prior to starting a new operation.

It is hoped that the forthcoming report will encourage prospective operators to give due study to the factors on which success depends, and thus forestall the beginning of enterprises that would probably result in failure. The prevention of such unfortunate results should increase the stability of the industry as a whole, and thereby benefit both producer and consumer.

MASONRY, NATURAL AND PUZZOLAN CEMENTS PRODUCED, SHIPPED AND IN STOCK IN THE UNITED STATES, 1926 AND 1927

Year	Active plants	Production Barrels	Shipments Barrels	Shipments Value	Stock (Dec. 31) Barrels
1926	11	2,104,891	2,031,851	$2,820,110	181,928
1927	11	2,123,868	2,158,323	2,881,029	147,473

An American Pozzolana and Its Effect on Portland Cement Concrete

Some Corrections and Additions to Article in September 29 Issue of Rock Products — Theories of Pozzolanic Action

By Dr. Lee Heidenreich
Consulting Engineer, St. Louis, Mo.

ABOUT one year ago, a series of tests were made at the testing laboratory of the Atchison, Topeka and Santa Fe R. R., at Topeka, Kan., to ascertain any difference in result between the standard mix of "1-2-4 concrete" with six bags of portland cement to the cubic yard, and the same mix, but substituting one bag (40 lb.) of pumicite for one bag of portland cement, using five bags of cement instead of six bags, both mixes having a water-cement ratio of 0.94.

Among a number of cylinders broken, thin sections were taken of a 90-days' cylinder made of plain concrete, with six bags of cement and of a 90-days' cylinder of pumicite concrete, with five bags of cement and one bag of pumicite, both cylinders breaking at 5780 lb. per sq. in.

Fig. 1 shows about a 75 times enlargement of the plain concrete, and Fig. 2 same enlargement of the pumicite concrete.

The large irregular patches in Fig. 1 are particles of cement which have not combined with water used in the mix, and do not aid in binding together the sand and stone of a concrete.

Pozzolana Helps Hydration and Makes Denser Concrete

The comparative absence of unhydrated particles and the dense, homogeneous character of the matrix in Fig. 2 seems to show the effect of the pumicite in producing a more efficient hydration or hydrolysis, in spite of the reduced amount of cement used.

Improved portland cements are being produced, "super-cements," which by special treatment in manufacture, are sought to increase the capacity for hydration, and I here reproduce a reflected section of Vulcanite portland cement after 90 days' hydration, compared with a photomicrograph of neat "super-cement" after 90 days. (Figs. 3 and 4.)

A comparison of these four photographs shows a remarkable similarity in effect in 90 days.

In neither case can the hydration be considered as completed, but in both cases the improvement shows itself to be due to an increased homogenity and uniformity in the hardening process.

The Pumicite Co., St. Louis, Ray E. Pickrel, president, is now completing a large pumicite plant at Fowler, Kan., with an initial capacity of 400 tons of pumicite per day, with facilities for further improving the product.

Several cement plants are conducting research with a view of using a pozzolana like

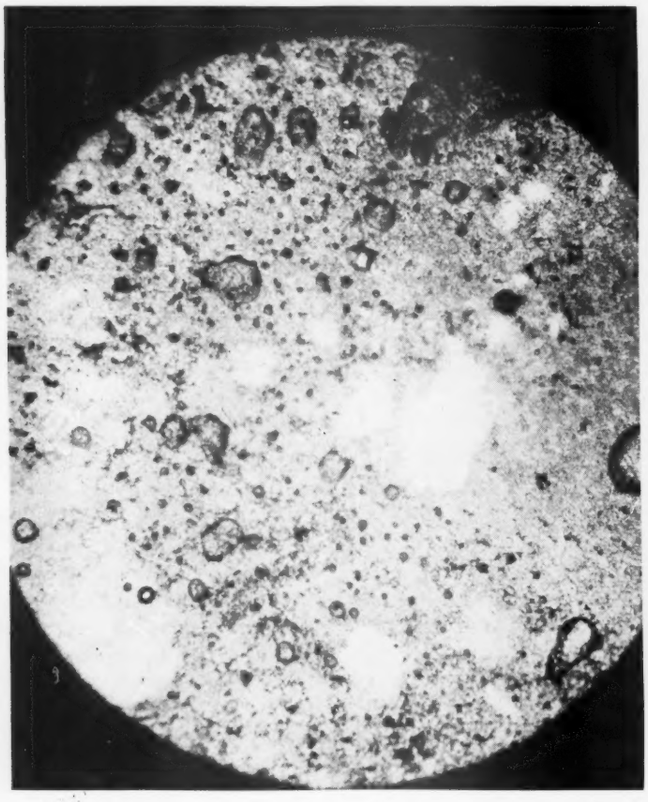


Fig. 1. Photomicrograph of plain concrete about 75 times enlarged

Fig. 2. Photomicrograph of concrete containing pumicite about 75 times enlarged

Fig. 4. Microphotograph. Neat "super cement" magnified about 80 times. Plain polished, not etched. Storage 1 month water; 2 months in air. Age 3 months. This view was taken under same conditions as Fig. 3, with which it should be compared. Note the comparative absence of unhydrated particles, and the dense, homogeneous character of the matrix or "glue," which is the only part of the cement which does any useful work

pumicite as an admix like gypsum, to benefit by the action of the pozzolana which has manifested itself in concrete. It seems to be a function of the relative chemical compositions of the portland cement and the admix as well as a question of percentage. Experiments have been conducted for over a year in the laboratories of cement plants on the Pacific coast—and recently in midcontinental as well as eastern plants.

In the meanwhile the research in the testing laboratories of at least six state highway departments is progressing to ascertain the effect of pumicite on strength, permeability and volumetric changes of concrete.

On the Theory of Pozzolanas as Admixture to Cement or Concrete

According to Kühl, the tricalcium aluminates are of special importance as they form trivalent ions—and "the ability of ions to form gels and to coagulate them, is dependent on the valance."

Now the tricalcium aluminate cannot exert its coagulation effect on the gradually forming colloidal solution of the calcium silicate, as long as there is any $CaSO_4$ present to form an insoluble salt with some ingredient of the cement.

If alumina can be added to offset this action by the gypsum, a calcium aluminate may be formed with water, which caused the initial set.

According to R. H. Bogue, the set is caused by precipitation of the colloidal silicate induced by ions, especially trivalent aluminate ions. Calcium sulfate keeps the ion concentration too low to function as above by precipitation of calcium sulfoaluminate.

The addition of pumicite or a pozzolana, which has a potential tendency to combine its alumina content thus helping offset the gypsum action whether it be a catalytical or electrolytic influence, should *a priori* result in a more complete hydration of the cement, such as has been proven in practice.

Therefore, experiments with thin sections of cylinders broken at different stages of hydration and under different percentages of gypsum and alumina in the cement and different percentages of Al_2O_3 and Fe_2O_3 in the pumicite or pozzolana, should furnish an illustration of and a reason for the peculiar action of pumicite on concrete.

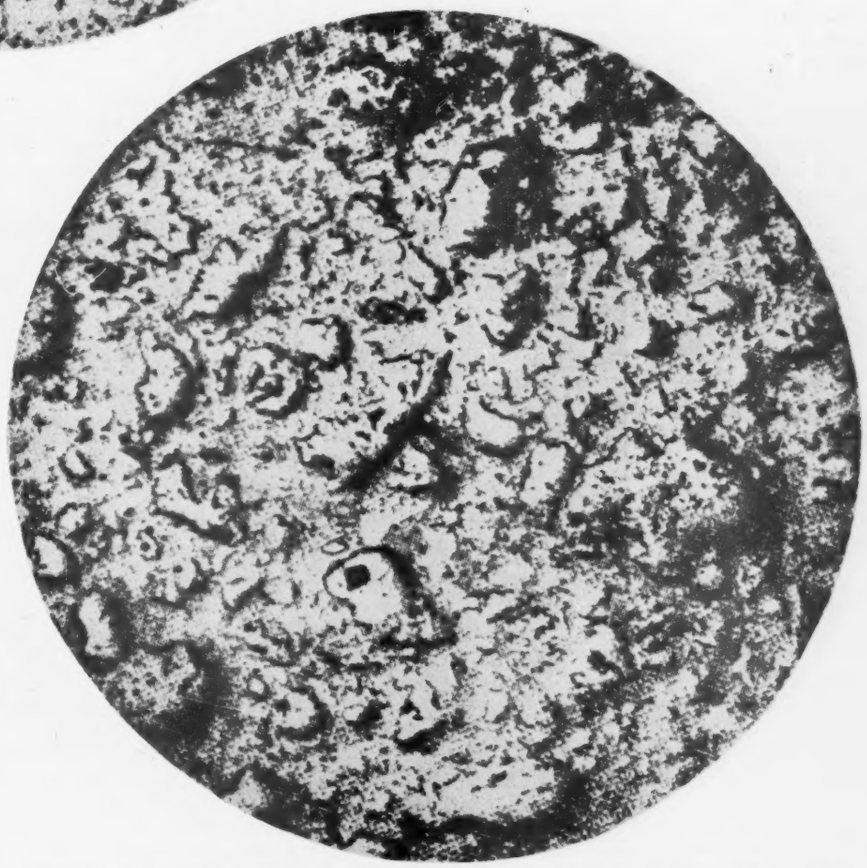


Fig. 3. Photomicrograph. Neat cement magnified about 80 times. Plain polished, not etched. Storage: 1 month water, 2 months in air. Age 3 months. The large irregular patches are particles of cement which have not combined with the water. They do not aid in binding together the sand and stone. The chemical union of these unhydrated particles with the water is not completed

Lime Burning Practice Based on European and American Observations

Part XI.—Tunnel Kilns and Rotary Kilns in Europe

By Victor J. Azbe
Consulting Engineer, St. Louis, Mo.

WHILE the writer was visiting the Mineralogical Institute in Leipzig, the July 23, 1927, issue of ROCK PRODUCTS arrived. On opening the magazine an article by Walther Pohl on tunnel kilns was found. The very next day a visit was paid Mr. Pohl, at Meissen, near Dresden, with a view of discussing this kiln.

A tunnel kiln is in a way the same as a ring kiln described in the previous article of this series, only in this case the firing is stationary and the charge moves. For this purpose specially designed and insulated trucks are pushed through the kiln.

Mr. Pohl was found to be quite optimistic. His idea was that since the kiln is practical for burning brick and other clay ware, why should it not be practical for the burning of lime? His other assumptions were also based on a similarity of conditions between lime and ceramic ware, which, however, are quite dissimilar.

Limestone presents an irregular surface and is variable in size, and moreover it absorbs a great deal more heat at the time of conversion from stone to lime than does the clay ware at this same temperature. Then, burned clay is a fairly poor conductor of heat, while lime is a very poor conductor, so the core in a lump of lime is burned with corresponding difficulty. For this reason a kiln, the design of which is practical for one, may not be so at all for the other.

Clay ware to be burned in tunnel kilns is spaced with considerable care, and even then certain portions are burned harder than others. To load limestone in the same way would be too costly; that is the main objection to ring kilns. Mr. Pohl's intention is not to load by hand, but automatically, but the objection to this will be that if the stone is not rather uniform in size, and of cubic fracture, some lumps will arrange themselves so that flame cannot penertate readily and core will be the result.

But assuming that it will work satisfactorily (which assumption is not at all justified, since only about 100 tons of lime were burned by this process in Germany), what will be the gain over an ordinary good shaft kiln? Certainly the maximum amount of lump lime will be obtained, but that to an American producer is not of so great importance. The lime will not be discolored, but neither will the lime from a modern gas-operated plant. The efficiency will be high, but it is doubtful if much higher than that of the best gas-fired kilns, and certainly not so high as that of the best mixed-food kilns. Mr. Pohl expects a ratio of 5½ to 1, with efficiency of clay ware burning kilns used as a base; but lime, as was said, is different and requires a longer burning zone; the heat penetrates with greater difficulty, and the air will not be preheated as readily. Then, the great length of the kiln, the ground space necessary for a comparatively limited capacity, the high first cost; the peculiarity of operation, of track system, of loading, of unloading, all point against this system for all except cases where lime is crumbly and small lime not wanted. Otherwise the large, induced-draft, gas kilns for cleanest lime, and large, forced-draft, mixed-feed kilns for highest fuel efficiency, are simpler and superior and by far cheaper per ton of output than the tunnel kiln.

Fig. 68. The plant of the Austro-American Magnesite Co. at Radentheim, Austria, set in a surrounding of beautiful hills

Rotary Lime Kiln

A rotary lime kiln is by nature inefficient, because it works, in the main, according to an entirely different principle of heat transfer than the shaft lime kiln. Most of the heat in the rotary kiln is transferred by radiation, that is, the gases and the lime do not come in contact to any great extent. Most of the heat in the shaft kiln is transferred by convection, that is, the hot gas and the lime come into rather intimate contact. Therefore a rotary kiln, even when 300 ft. long, will have a waste gas temperature of 1000 to 1200 deg. F., while a shaft kiln of only 40 ft. active height may have an average waste gas temperature of less than 400 deg. F. For this reason a fuel-lime ratio of 3 to 1 for a rotary kiln is good, and so naturally with the high level of fuel costs in Europe they are not used there. The low labor partially offsets the high fuel costs, but shaft kilns are in existence, and have been de-

scribed in this series, which also have low labor requirements per ton of output.

A visit was paid to the plant of Austro-American Magnesite Co. at Radentheim, Carinthia, Austria, where rotary kilns are in use for the dead-burning of magnesite; considerable quantities of this dead burned magnesia are exported to the United States for use as refractory material in steel mills, such as for lining of converters, etc. Some caustic magnesia is also produced.

Fig. 69. Typical houses of the interesting country about the Austro-American company's plant

Austro-American Plant in Attractive Setting

Fig. 68 shows the plant located among beautiful hills. This entire section is popular with Austrian and German tourists, but not so well known to the American. Fig. 69 shows some farm houses typical of this country.

The writer was very much surprised to find such a plant, modern in every respect, impossible to be excelled by any in the United States, in this secluded and otherwise non-industrial section of the country, and at a considerable distance from the railroad.

There are several vertical kilns, most them abandoned. The operators, however, are still experimenting with the two larger ones fired with gas, but they are not fully satisfactory in spite of the higher fuel efficiency, because when magnesite is sintered it becomes soft and inclined to stick. These kilns were not operating at the time of the visit. Mr. Stehle, the technical director, who conducted the writer through the plant, stated also that mixed-feed kilns are not used due to possible contamination of magnesia.

There were two rotary kilns, one 328 ft. long and 9 ft. in diameter; the capacity of this kiln was 275 tons a day. The coal was powdered in ball mills and 88 tons were fired in the large kiln per day. The kiln was equipped with all possible instruments including a "Mono" recorder, which automatically records both CO_2 and CO in the waste gas. The kiln, practically speaking, was operated with no oxygen, no carbon dioxide and no smoke.

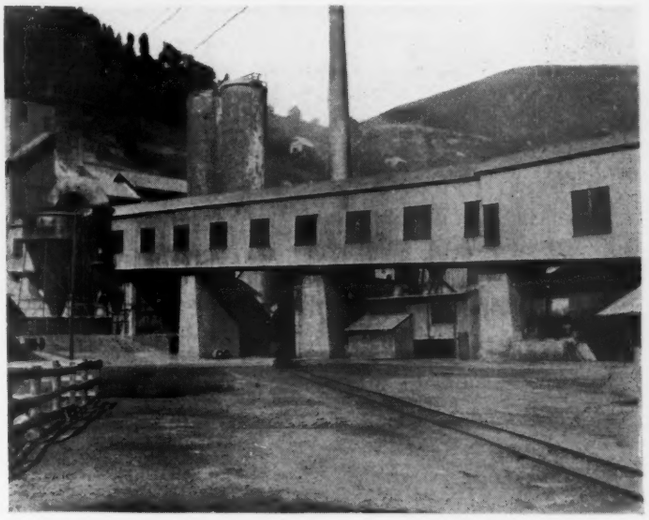


Fig. 71. The Austro-American plant with a cyclone dust collector at the left, showing the remarkable cleanliness of the grounds

Everyone will admit, even when the fact is considered that magnesite decomposes at lower temperatures than limestone, that this kiln output was remarkably high. That almost 90 tons of coal were burned by itself proves this. The ordinary American rotary lime kiln has an output of 100 to 125 tons, and burns 35 to 45 tons of coal per day; let's grant that the kilns are shorter, but that explains only a small part of the difference in capacity. Rotary kiln capacity is not at all proportionate to the length. The reasons for high capacity of this kiln is rather interesting. It has been stated that the locality is somewhat of a summer resort; naturally, there was considerable objection raised to clouds of dust discharged from the stack, especially since the high hills around the plant often prevented these from being rapidly carried away. The inhabitants of the valley naturally complained, and the courts agreed (there being less of the so-called freedom over there), and so it became necessary to remove the dust from the kiln gases, which was accomplished quite effectively.

In the background of Fig. 71 a cyclone dust separator will be noted, also two concrete towers. A fan draws the gases from the kiln through the cyclone separator and discharges them into the two towers, where whatever dust was not taken out by the dust separator is washed out. Director Stehle stated that the separator removes 65% of the dust.

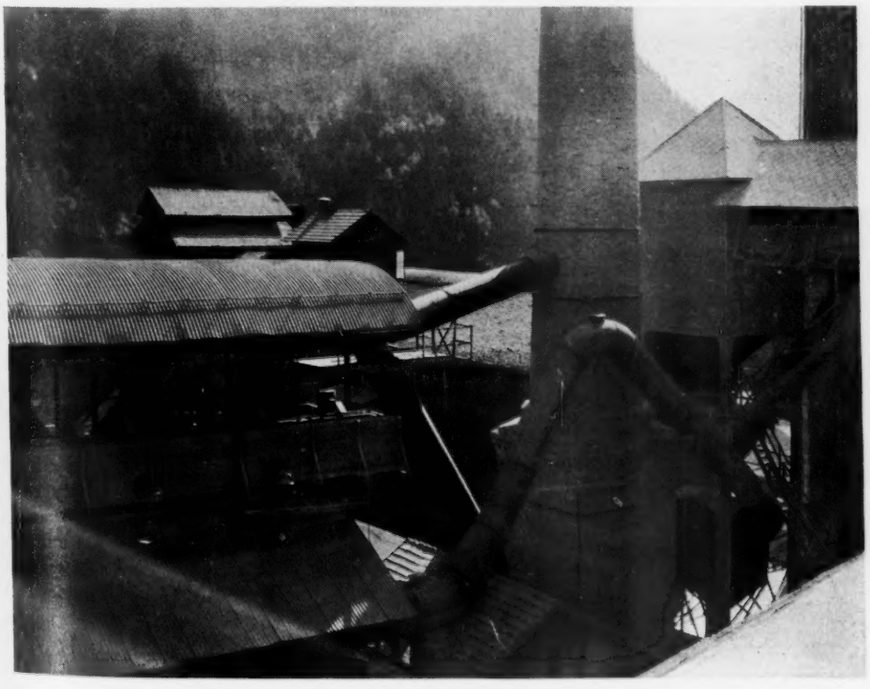


Fig. 72. The electrical dust extraction system at the Austro-American plant

Naturally for such an operation considerable power is necessary, and the fan is connected to a 100-hp. motor. The suction at the fan is 18 in. Most of this is lost in the separator and in the connections, for which purpose the fan was primarily installed. However, there still remains 6 in. suction, which is available at the kiln and for drawing the gases through the kiln; and it is this high draft that makes it possible to burn the large amount of coal that produces the very large amount of sintered magnesia.

American, rotary, lime kilns, are limited in capacity either by the gas producers not being able to burn sufficient coal, or by the

Fig. 70. Inside the Austro-American plant showing how well taken care of the plant is

draft being insufficient. The gas producers of the largest type have an ordinary capacity of 40 tons of coal (possibly a little more), and then they operate at highest rate. Often blast pressures of 10 to 12 in. are noted, and the kiln 200 to 250 ft. long is putting out 120 tons of lime when going good. If the gas producer capacity were 60 tons, with very little drop in efficiency, the kiln would produce 170 to 190 tons of lime, if the draft were sufficient to draw off the gases. The capacity of the very expensive rotary kilns is held back because the chain of which the plant is made up has weak links in it; one portion is inconsistent in design with another portion.

This Austrian magnesia plant has also a shorter, 130-ft. rotary kiln, its capacity being 65 tons per day. The gases from this rotary pass through an electrical precipitator Cottrell system of dust extraction). The alternately positive and negatively charged electrodes pass high tension voltage electricity, that charges the dust particles in such a way that they aggregate upon collecting surfaces, then drop into collecting chambers. The amount of current used for this purpose on this small kiln was only between 6 to 8 k.w., although the voltage was close to 50,000. Fig. 72 shows the part of the plant where this process is in operation.

The gain derived from the cleaning of the gases has increased the capacity of the kilns; in addition it was found that the dust collected could be used for making wall board, a valuable by-product; and then there was the satisfaction that the plant was not a nuisance to the neighborhood, that it did not injure the scenery of one of the most beautiful sections of central Europe. And the writer never anywhere visited a more orderly and cleaner plant than this. Study Fig. 71 for a while; is there any rubbish collected anywhere? And the photograph cannot possibly show the extreme cleanliness. The photographic film wrapper I put in my pocket and discarded after I left the plant; if I had thrown it away in the plant yard one would have noticed it for a hundred feet. Is it not better to have such a looking plant rather than the one shown in Fig. 73, located on the Rhine, clouding up the sky for miles around and advertising to the thousands and thousands of foreign tourists traveling up and down on the Rhine steamers that technically even Europe is still far from being perfect.

Cableway Conveying System Used

The Radenthein plant is located some eight miles from the quarry and about equal distance from the railroad, all of the product is transported over high hills, often over long spans by means of a cableway, and this method of conveyance is found quite satisfactory. Theodor Klehe, in his book "Das Kalkwerk," states that for a 2-mile distance, a difference of level of only 23 ft., a capacity of 50 tons per hour, at a travel speed of 6 ft. per sec., 18 hp. are necessary for operation of this type of system.

The stone is first crushed, then washed, and fed into the kilns wet, in sizes from almost dust up to 1½ in., a very irregular sizing.

The kiln must be repaired about once a year. Magnesia, the same material that is produced, is used as the kiln refractory. Magnesia is however only practical where a clinker forms over its surface, due to its inability to withstand temperature changes.

Preheated air from the cooler is used in the kilns; the cooler is rather interesting as part of it acts as a revolving screen, the 1-in. size material being sacked as it is, and only that over 2 in. being broken.

Fig. 73. One of the smoke-belching plants along the Rhine river

When the rotary kiln is used for burning caustic magnesia there are difficulties. The decomposition temperature of magnesite is low, and for this purpose it must not be over-burned, so a large amount of excess air is then used, but still powdered fuel is not fully practical. The writer recommended gas recirculation to them.

Powdered fuel was tried for burning lime in this country, but to no great extent. The main objection found in a certain plant was small specks of carbon or ash or both on the surface of the lime. Director Stehle was asked about this, but said that he never was troubled with that difficulty in the manufacture of magnesia.

(To be continued)

New Process Saves Quantities of Mica Once Washed Away

SALVAGING of thousands of dollars of materials formerly lost is the outgrowth of the installation of a new process for recovering mica from kaolin clays in western North Carolina.

Two new plants, according to State Geologist H. J. Bryson, are already in operation in Mitchell and Yancey counties; two others are under construction and will be ready for service shortly. The General Mica Co., Spruce Pine, erected the plants now operating and one each is being built by the Harris Clay Co. and the Norman G. Smith Co.

Plants now in service recover mica which will pass through a 20-mesh screen, and one of the new ones is expected to recover all coarser than 20-mesh.

Geologist Bryson, who noted these developments while making a survey of the mineral industry and resources in the mountains, has been informed that one man can recover from two to four tons of the mica a day, or enough to bring in a revenue of from $100 to $125. One of the plants at this time reports an output of between 10 and 12 tons daily.

"With the establishment of this new recovery process at the clay pits," says the state geologist, "it is probable that many of the wet grinding mills will go out of business. The grinding mills will probably not be able to compete with the new process, and since the wet grinding plants can only produce two tons of ground mica per mill during a 24-hour day it can readily be seen that they cannot compete."

Discussing further the significance of the development, Geologist Bryson says: "The mica has always been considered a menace to the clay industry and the process of extracting the fine mica has been a very complicated one.

"The mica, a waste product, has been permitted to go down the streams and has always been considered as of no value. This is no longer true because the fine scrap mica, varying from 20- to 200-mesh, can be readily sold at prices ranging from $20 to $120 per ton."

Barge load of sand at brick plant wharf

Unloading lime with portable conveyor outfit

Modern Sand-Lime Brick Plant on Brooklyn, N. Y. Waterfront

Sand Received by Water; Lime by Rail; Shipment of Brick by Truck and Water

THE growth of the Paramount Brick Co. of Brooklyn, N. Y., is a fair example of how the sand lime brick business can grow in a locality where there is a good market for the product and a brick of good quality is made to supply it. This concern started in business about a year before the notes for this article were made and it has found itself so far behind its orders that it has had to add more machines and otherwise increase its capacity to keep up with them. It will soon be the largest plant in the United States, and when all the contemplated additions are finished it will be, with perhaps one exception, the largest producer of sand-lime brick in the world.

The Komnick process is employed, which differs from the usual method in the manner of hydrating the lime and adding it to the sand. All the machinery was supplied by the Komnick Machinery Co. with the exception of the electrical equipment, which is of both Westinghouse and General Electric make.

A flow sheet of the process accompanies this and the description will follow in the same order beginning with the course of the sand. This is ordinary asphalt sand produced by one of the large sand and gravel producers on the north side of Long Island. It is not classified as a silica sand, although naturally it is high in silica, but it contains no substances that would keep it from being made into sand-lime brick. It has been washed in an ordinary sand and gravel plant and it is unusually free from clay. And its success in this plant is a good illustration of a fact that the industry has many sands not sufficiently high in silica to be used in glass making, or some of the other purposes for which silica sand is prepared, that will make as good sand lime brick as a high grade silica sand would make.

The plant is on a canal leading from New York harbor and barges filled at the sand plant are brought to the dock of the Paramount company. Here they are unloaded by a Moore "Speedcrane," a type of locomotive crane on crawler treads, with a 1-yd. Haiss bucket. The same crane also unloads barges of the coal that is used as fuel, putting the coal into a Butler bin so that it can be easily fed into the stokers of the boilers.

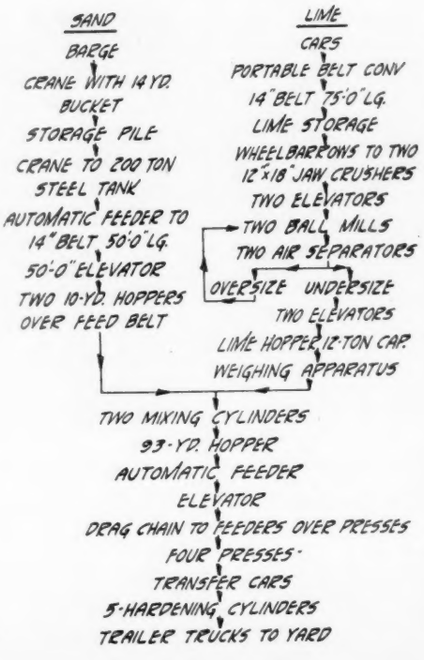
The sand is lifted by the crane to a 200-ton round steel tank that stands above a sort of galley joined on to the main building in which a conveyor is housed. Below this tank is an adjustable table feeder driven by the same 7½-hp. motor that drives the belt. The belt is 14

General view of the Paramount Brick Co.'s new sand-lime brick plant in Brooklyn, N. Y.

in. wide and has only two troughing rolls instead of the usual three. It delivers the sand to a 50-ft. elevator, which delivers it to two hoppers situated directly over the mixing drums. Each holds 10 yd. and they are used for measuring the sand in batches to be mixed with lime.

The lime, obtained from a plant in Virginia, is brought in by railroad cars over a track that runs parallel to the dock. It is unloaded on a Haiss portable conveyor and falls on a 14-in. conveyor that runs parallel with the conveyor for sand. This carries it to the lime storage bins, open rooms from which the lime is withdrawn as required.

The lime crushing and separating plant is in two units, each consisting of a jaw crusher ball mill and air separator. All the machines are of Komnick make. The ball mills were designed for use with air separation. One unit has a capacity for 4400 lb. per hour, the other for 1760 lb. per hour, and only the larger unit is in operation at present, as it has sufficient capacity to supply the four presses now installed. When more presses are in place the smaller units will be employed.



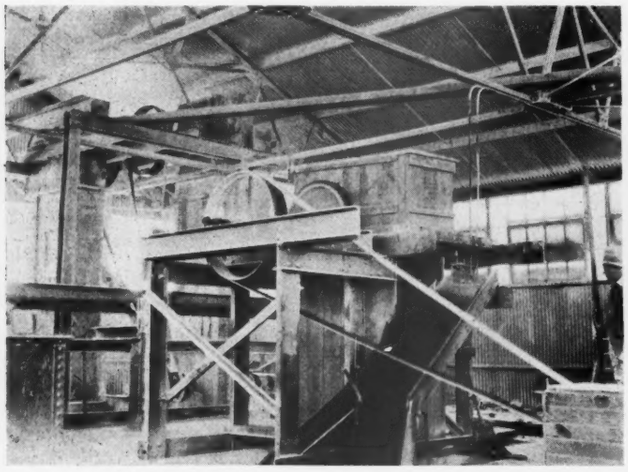
Flow sheet of plant

With both units in operation the lump lime is dumped into two 12x14-in. jaw crushers and the discharge of the crushers goes directly into short elevators that lift it to the two ball mills. They discharge into separate elevators that lift the ground lime to air separators on the upper floor of the plant. The oversize from the air separators goes back to the ball mill to be reground. The part that has been sufficiently ground goes to the lime storage hoppers by short elevators.

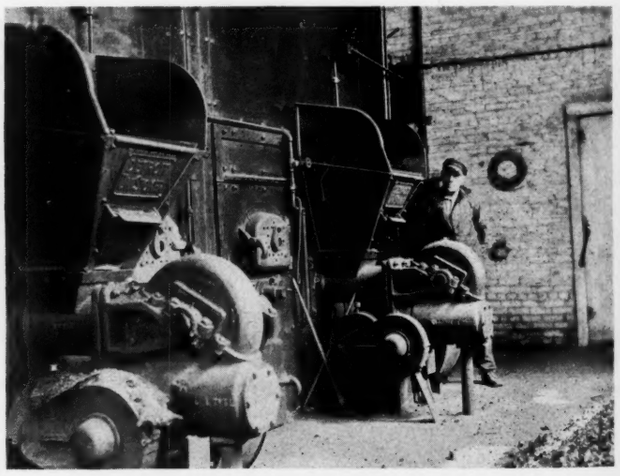
The use of the air separators is interesting, outside of their use in a sand-lime brick plant. Experiments with air separation on pulverized quicklime have been made that have not been successful, so that fine screens had to be substituted. But in this plant they seem to work very well.

Under the lime hopper is a Komnick automatic weighing device which receives the lime and shuts off the flow as soon as the proper weight has been received. This is 6% of the weight of the sand.

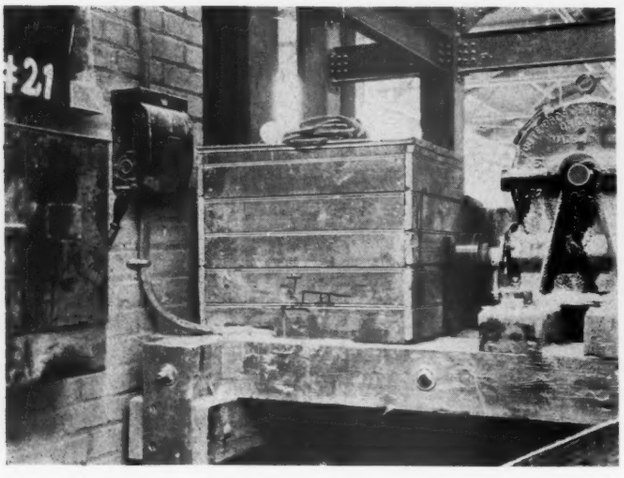
The sand from the hopper mentioned above and the lime from the weighing device flow together into one of the mixing



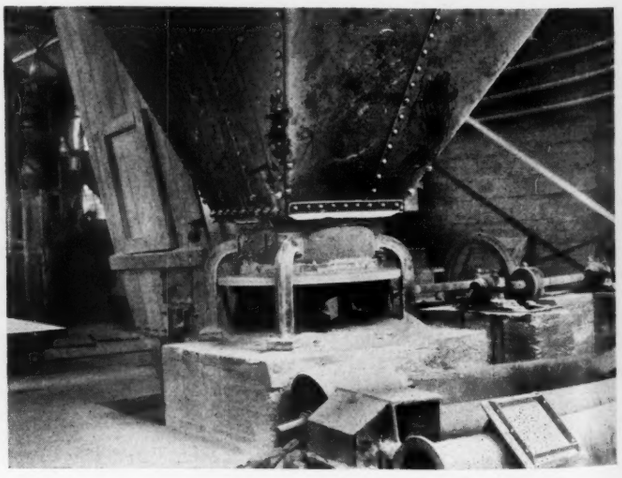
Top of sand elevator—filling measuring hoppers



Boiler-room—automatic stokers on boilers

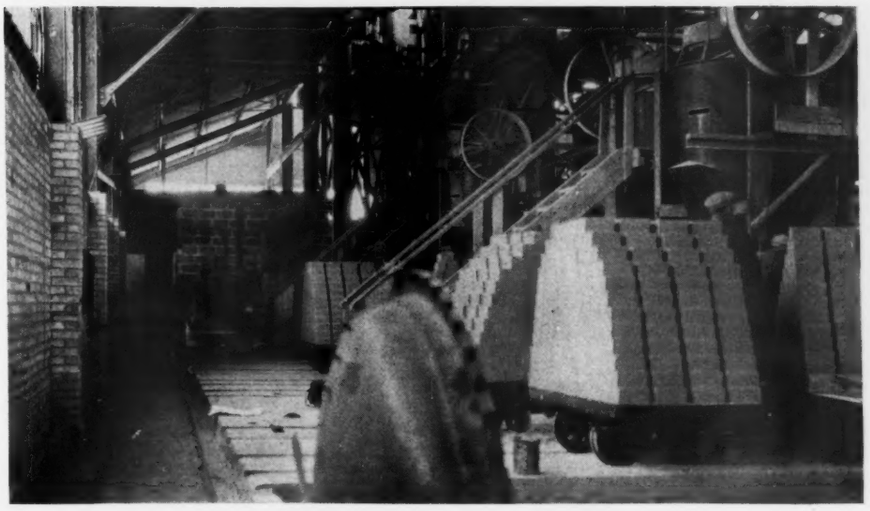


Drive on sand elevator showing latest drive and control equipment

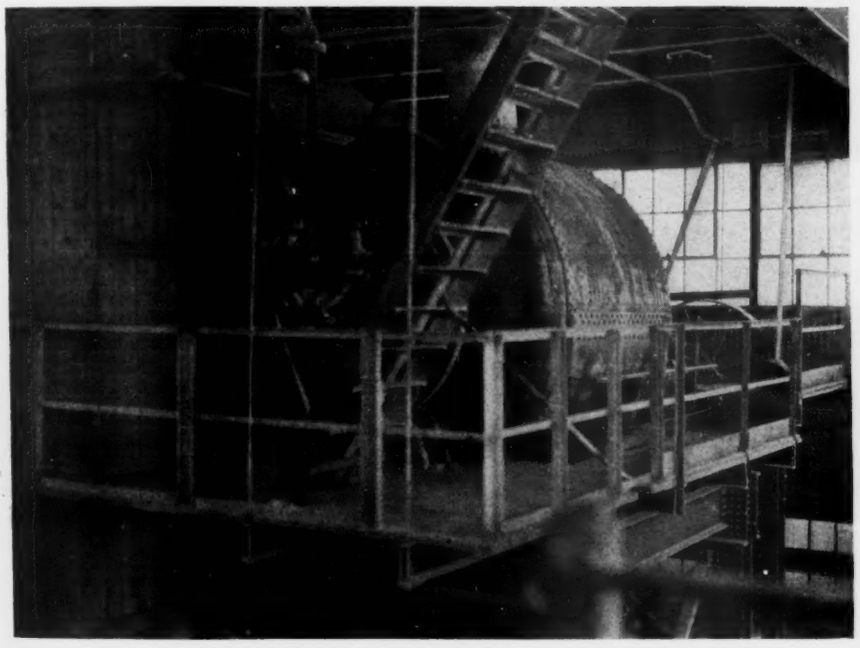


Bottom of hopper which receives mixer discharge, and the table feeder

drums which are the special feature of the Komnick process of brick making. It holds 18 cu. m. (about 23 cu. yd.) and it is fitted to admit water and steam and has blades in the interior by which the contents may be churned and mixed. Water is let in in sufficient quantity to hydrate the lime, and the cylinder is closed tightly. If the hydrating starts promptly, as shown by a rise on the pressure gage, no steam is admitted, but if a little heat is needed to start the hydration steam is turned in. It takes about 20 min. to hydrate the lime and mix it thoroughly with the sand and the end is judged to have been reached when the pressure gage of the drum stands at 45 lb. A batch is put through every half hour, as 10 min. are needed for charging and discharging the drum. The mix leaves the drums warm and in the state known as "semi-dry," which is the proper condition for pressing. Two mixing drums are in use and two more are being installed.



Looking down on the line of presses

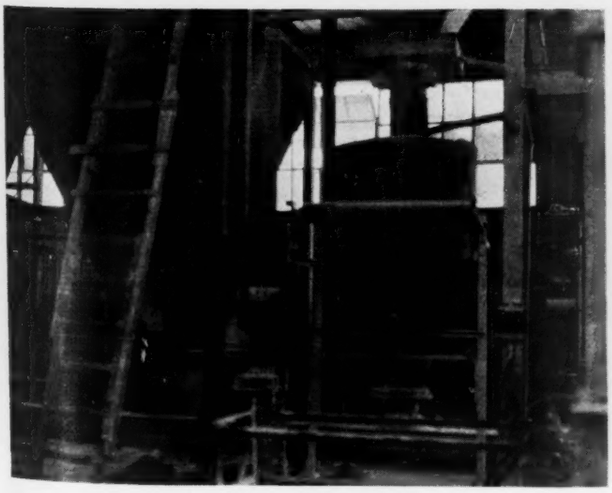


Mixing cylinder for mixing sand and lime under pressure

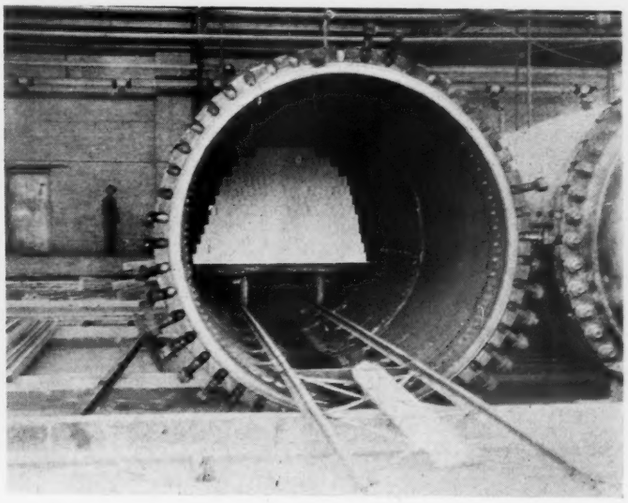
The mix is dropped from the drums into a large steel hopper holding 93 cu. yd. From this it passes through an adjustable feeder into the boot of an elevator that lifts it to a drag chain made by the New Holland Machine Co. The trough in which this drag chain works has gates over the hoppers of the presses through which the hoppers are filled.

There are two right and left presses of the heavy type and two right and left of the light type. The heavy presses were originally designed for making slag brick and are capable of exerting a much higher pressure than is needed for sand lime brick, which require about 6000 lb. per sq. in. The lighter type presses will be installed as the plant is brought to its proposed doubled output. The presses have 12 mold tables, and automatic thrust out arrangements and the mold filling pressure on the bricks can be regulated and adjusted. All presses are provided with automatic oiling.

From the presses the bricks are trans-



Lime-weighing device



Hardening cylinders

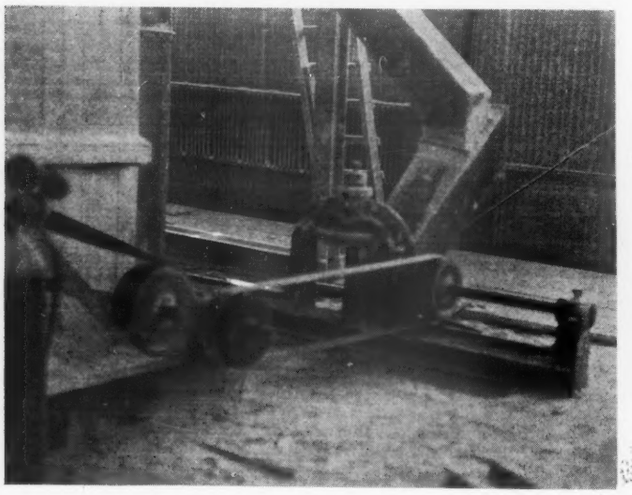
One of the two air separators which separate ground quicklime

ferred to the hardening cylinders by two types of cars, one electrically driven, the other driven through a chain and sprocket by man power. There are five hardening cylinders now and three more are being installed. The cylinders are all 61 ft. 8 in. long and 6 ft. 6¾ in. inside diameter and each holds 19 cars of brick. Hardening takes place in about 12 hr. and a steam pressure of 125 lb. is carried.

Steam for the hardening cylinders is provided by two 200-hp. boilers made by the E. Keller Co., Williamsport, Penn. Coal is used for fuel and the firing is by two Detroit "unistokers."

The bricks drawn from the hardening cylinders are transferred to Warren trailer trucks and brought out into the yard by hand or by an "Autotruck," a small gasoline locomotive, such as is used for handling mail and baggage to the larger railroad stations. Deliveries may be made by rail and by water, via the canal, but most deliveries are made by motor truck. There is a good demand for sand lime brick in Brooklyn and

Sand tank, holding 200 tons, which is fed by locomotive crane



Air separator drive

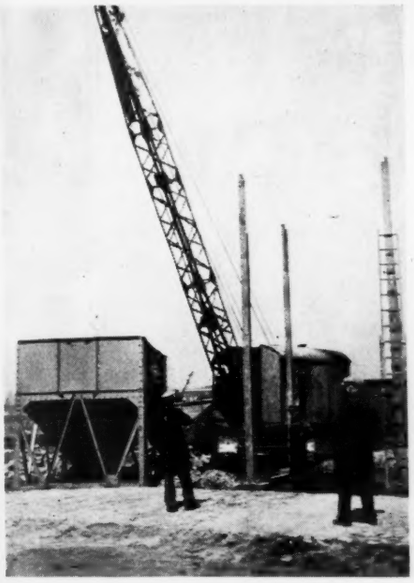
Office and delivery shed

Loading delivery truck from yard transfer truck

Gasoline locomotive and truck for transfer from cylinders to storage

other parts of New York City, especially for lining the interior courts of the larger buildings. Their light color, and the fact that they keep their color so well, is what adapts them to this use.

This plant is housed in a "Trus-Con" steel frame building of a standardized type except that it has been reinforced somewhat. The main building is 180x76 ft. and 55 ft. high. The mixing section is 40x60 ft. The storage yard, 50x200 ft., is paved with concrete and the yard between the building and the canal has been paved with granite paving blocks to withstand the moving of the crane.



Crane and coal bin

A list of the various machines and the horsepower required for each follows:

2 mixing drums, each	25	h.p.
1 elevator to presses	1½	h.p.
1 automatic feeder on hopper	8	h.p.
1 drag conveyor to presses	5	h.p.
4 feeders for presses, each	4	h.p.
2 presses, heavy type, each	16	h.p.
2 presses, lighter type, each	14	h.p.
1 sand elevator	2	h.p.
2 lime elevators, each	1½	h.p.
2 air separator elevators, each	1	h.p.
1 belt conveyor for sand	3	h.p.
1 belt conveyor for lime	3	h.p.

The capacity of the plant with two presses running 8-hr. shifts and two 16-hr. shifts is 230,400 brick per day. When all the new installation work is complete the capacity will be for more than 100,000,000 brick per year working day and night.

The product of this plant is excellent. Tests made for samples taken directly from the hardening cylinders follow, each test being the average from five or more specimens, and the variation of any sample from this average was very little:

Transverse bending test, per sq. in.	1010 lb.
Compression test, per sq. in.	5315 lb.
Compression test net after absorption test, per sq. in.	4585 lb.
Compression after freezing and thawing test, per sq. in.	5045 lb.
Absorption	10.9 %

The office of the Paramount Brick Co. is at the plant and B. R. Robbins is president and treasurer.

Tariff on Fluorspar Increased by Presidential Proclamation

PRESIDENT COOLIDGE issued October 17, a proclamation under the flexible provisions of the Tariff Act of 1922 increasing the rate of duty on imports of fluorspar containing not more than 93% of calcium fluoride from $5.60 to $8.40 per long ton. The proclamation becomes effective 30 days from October 17, in connection with the proclamation, it was stated that the Tariff Commission had reported to the President, that the increase was necessary to equalize the difference in the cost of production of fluorspar in the United States and England, the principal competitor.

The statement, in part was as follows:

"Fluorspar is used principally for three purposes; (1) As a flux in metallurgical processes, principally in steel making where it is essential; (2) as an ingredient in products of the ceramic industries, such as enamels and opal glass; and (3) as a raw material in the manufacture of aluminum and for hydro-fluoric and other chemicals. There are three grades of fluorspar, metallurgical, ceramic and acid, corresponding to the principal uses.

"Cost of production data, adequate for cost comparisons, could not be secured for the acid and ceramic grades, and the Commission's findings are accordingly confined to the metallurgical grade, which comprises from 80% to 85% of both domestic production and imports of fluorspar.

"The domestic production of fluorspar on a large scale began about 1904 and now amounts to about 120,000 short tons per year. Domestic consumption of fluorspar amounted in 1927 to about 184,000 short tons of which about 38% was imported."

Tongs used in handling brick

Florida Phosphate Deposits

FLORIDA ranks first in the production of phosphate in the United States, considerably ahead of Tennessee, which ranks second. According to the United States Bureau of Mines, the amount of phosphate mined in the United States during 1924 was 913,817 metric tons, of which Florida produced about 85%.

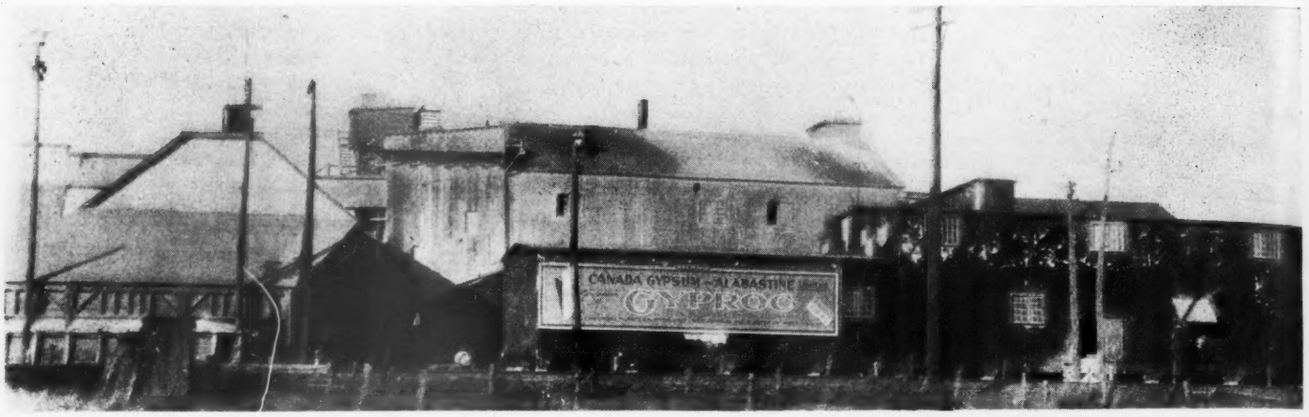
The phosphate rock in Florida is found within the peninsular section of the state and includes two types of rock, known under the descriptive terms of "hard rock" and "land pebble." In addition, minor quantities occur in a pulverulent form known as "soft phosphate."

The hard rock is found over a considerable area in the west-central part of the peninsula section of the state. North to south this belt extends about 100 miles. In width it does not exceed a few miles. In addition to this main narrow belt there are a few isolated small areas farther to the west in which a limited amount has been found.

The foundation rock underlying this part of Florida is a very pure, white, mostly granular limestone of late Eocene age and known as the Ocala formation. The hard rock deposits in the main belt rest upon this limestone without exception. Some of the isolated occurrences, to which reference has been made, outside the main belt, rest probably upon the later Chattahoochee formation of the Oligocene age. This overlying formation, made up of the matrix in which the phosphate is embedded, is extremely irregular, and includes a mixture of materials from various sources and of a diverse character, further affected by pronounced chemical activity within the mass.

The highly irregular manner of occurrence of the hard rock phosphates introduces an element of great difficulty in estimating reserves. The whole area that may possibly be productive can be definitely outlined. However, the average acre production within this area is extremely difficult to estimate. In the case of the land pebble phosphate the estimate can be made with less difficulty.

An estimate of the phosphate reserves made by the United States Geological Survey in 1924 gives 10 million tons reserve of rock in the hard rock area, 288 million tons reserve in the land pebble area and, in addition, 27 million tons reserve in the form of low-grade material in wash dumps, a total reserve of 325 million long tons in Florida at the end of the year 1924.—[*Abstract of an article by Dr. Elias H. Sellands, of the University of Texas, in Pan-American Geologist, April* (1928)].



New gypsum wallboard plant of the Canada Gypsum and Alabastine Co., Montreal, Que., Can.

New Gypsum Products Plant at Montreal

Canada Gypsum and Alabastine Co. Manufactures a Variety of Gypsum Plasters and Wallboard

THE NEW gypsum products plant of the Canada Gypsum and Alabastine Co. at Montreal, Que., is located in the industrial quarter of the city, close to the cement mill of the Canada Cement Co. and the National Cement Co.'s new plant. In the new mill the company has incorporated the long experience of its operating personnel, all of whom have been for many years in the gypsum industry.

Few individual plants in the United States manufacture the variety of gypsum products made at this Canadian mill. At least 15 different kinds of mixed plasters, including hair, sanded and special hardwall plaster, are numbered in the regular production. Wallboard, in thicknesses from ¼-in. up, widths from 30-in. and lengths of 6, 7, 8, 9 and 10 ft., is made on the same machine. The export trade, which takes a good portion of the production, uses sizes which are not considered standard in the United States and the company must be prepared to furnish them at all times. Shipments are made to localities many hundred miles from the plant, these no doubt being influenced by the fact that the nearest Canadian gypsum mill is at Caledonia, Ont., some 450 miles west. All water shipments have been made to Vancouver, B. C., via the Panama canal and the all-water route has been used to a great extent for the export trade.

Rock Storage

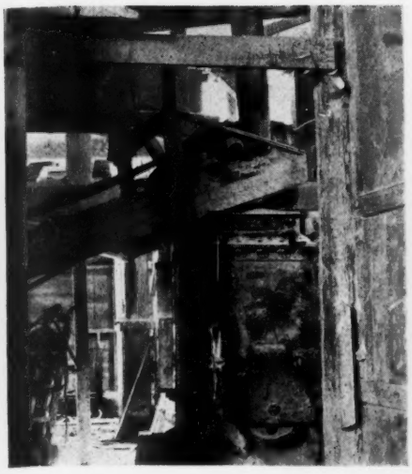
Two kinds of rock gypsum are used at the plant. The Ingonish gypsum comes from the Canada Cement Co.'s dock nearby and is worked up into wallboard and mixed plaster. The Mabou variety is made into finishing plaster, for it is a better grade. A spur track connects the rock storage bins with the unloading dock of the Canada Cement Co. The cars are dumped to the boot of an elevator located along the outside wall of the storage. The elevator carries the rock to the top of the storage and dumps to a cross conveyor belt running the entire length of the building. Trippers are placed at convenient places along the belt to discharge the rock. Under the present scheme, the Mabou rock is at one end of the storage shed and the Ingonish at the other. Both varieties of rock are reclaimed from storage by the same equipment.

A slackline cableway with overhead sheaves equipped with a ¾-yd. bucket reclaims the rock from all parts of the storage building, carrying it to a 30-in. Dunlop shuttle belt which feeds two bins near the crushers. The cableway is operated by a two-drum Morris hoist driven by a Crocker-Wheeler 28-hp., 550-v., 720 r.p.m. electric motor through a Crocker-Wheeler motor-level control. From 18,000 to 20,000 tons of rock can be stored at one time.

Crushing and Drying

The rock bins are of wood and hold about 200 tons. The belt from storage runs over them and trippers are placed along this to discharge the rock into the bins. Discharge gates on the bottom of the bins passes the rock to an underneath belt feeding a Williams Jumbo hammer mill which is the primary crusher. The rock is reduced from 4-in. (the size varies from 2½ to 4 in. as it comes from the mines) to ¾-in. and under and then sent to the rock dryer. This dryer is a vertical brick-lined cylinder, 10 ft. 2 in. in dia. by 40 ft. high, divided off into six

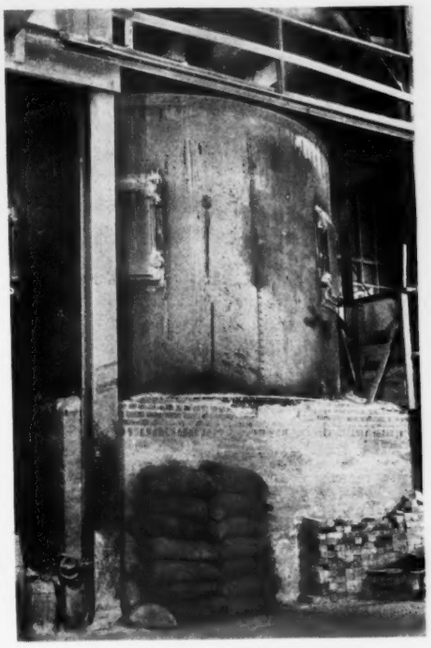
Drag scraper recovering rock gypsum from storage



Primary crusher and feed

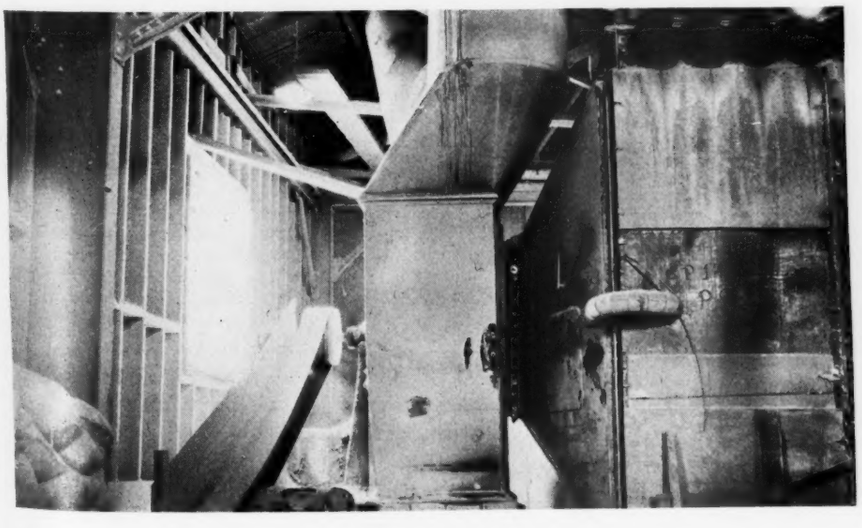
sections. Each section is fitted with a perforated bottom on which the rock rests, the heated gases passing upward through the holes. A central rotating shaft runs the entire length of the dryer and at places just above the perforated bottoms of each section there are fastened plows which serve to push the rock from the center towards the periphery in alternating sections. In the other sections the plows push the rock towards the center; thus the rock has to pass through all the six sections before it is finally discharged at the bottom. Each section has a door which may be opened to allow cooling air to enter or for observation. The dryer handles about 20 tons per hour and is said to have given good efficiency, reducing the free moisture in the rock to a minimum and in some instances partial calcination has resulted. The fire box is at one side and coke is used for fuel.

The dryer was made in France by Huillard and Bourgeon, Paris. It is driven by a Crocker-Wheeler 20-hp. electric motor which also operates the belt underneath the rock bins. Close by the dryer Bristol recording thermometers record the temperatures at the top of the dryer, the interior and the bottom. The usual temperatures attained are 150 deg. F. at the top, from 500 to 600 deg. F. at the interior and 250 deg. F. at the bottom or discharge. The discharge of the dryer is effected by a rotary bottom plate which feeds to a belt running to the secondary crusher. The gases from the dryer are passed to a By-Products Recoveries, Inc., dust collector from which the gathered dust is carried to land plaster bins.



The 12-ton calcining kettle

The dried rock is further reduced in a Pennsylvania hammer mill set to discharge a 20-mesh product. The mill is driven by a Luth and Rosen (Sweden) 100-hp., 550-v., 1235 r.p.m. electric motor which has the unusual feature of a built-in gear reduction, integral with the motor. Several of these motors are used with different plant equipment and their service has been quite satisfactory. The discharge of the hammer mill is carried to two Link-Belt vibrating screens, one of which is 8x3 ft. and of the recently introduced ball-bearing type and the other 5x3 ft. Each of the screens has a 14-mesh wire cloth; the oversize passes to a Munson Bros. buhr mill for further grinding and the throughs to land plaster bins. The product of the buhr mills is also sent to the land plaster bins.



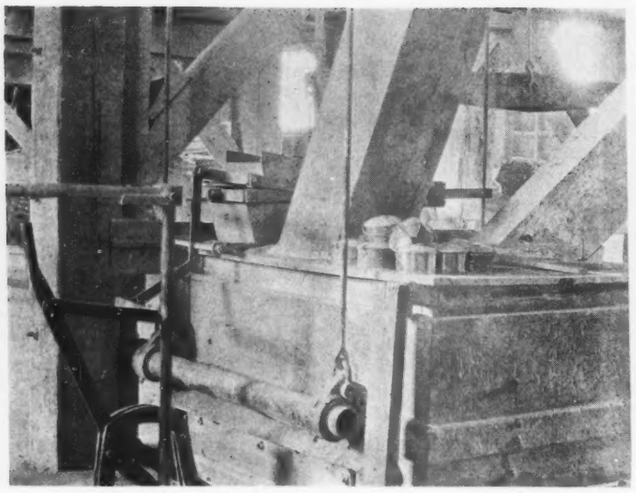
Dust collector and drive

Calcining

The kettle is 14 ft. 10 in. in dia. and 11 ft. high, with a capacity of about 12 tons. It was built from the company's design by the Owen Sound Iron Works, Owen Sound, Ont. Essentially it has a concave removable steel bottom with 12-in. crown, four inner flues in which the hot gases circulate and is also direct-fired by coal. Its agitation gear consists of two sets of rabble arms, below which a chain drag acts to sweep the bottom of the ketttle. A Lancashire 30-hp., 870 r.p.m. electric motor drives the agitator which is reduced to 15 r.p.m. by a set of gears. A Bristol indicating and recording thermometer is part of the kettle equipment and serves as a guide to the efficiency of the operation. The kettle is fed by screw conveyor from the land plaster bins. Dust from the kettle is carried by a stack and flues to a dust collector furnished by the By-Products Recoveries, Inc., New York. This collector has 12 perpendicular 20-mesh Toncap screens, set about 12 in. apart, the whole enclosed in a sheet iron case. Each of these sections is 12 ft. high and 10 ft. wide and has a vibrator shaker to loosen the dust which is collected at the bottom and carried back to the kettle. A 36-in. fan driven by a Crocker-Wheeler 20-hp., 950 r.p.m. electric motor draws the dust from the kettle to the dust collector. The shaking arrangement is operated by a 15-hp. motor which also drives other equipment.

Looking into one of the sections of the vertical rock dryer

The kettle is drawn at first settle which occurs in intervals of about 1½ hr. and the



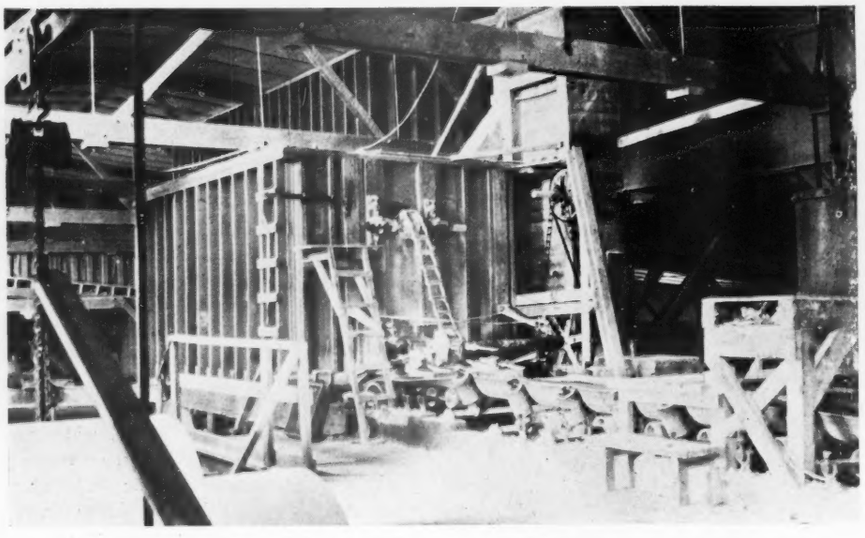
Stucco batching bin resting on electric scales

Plaster mixer and packing spouts

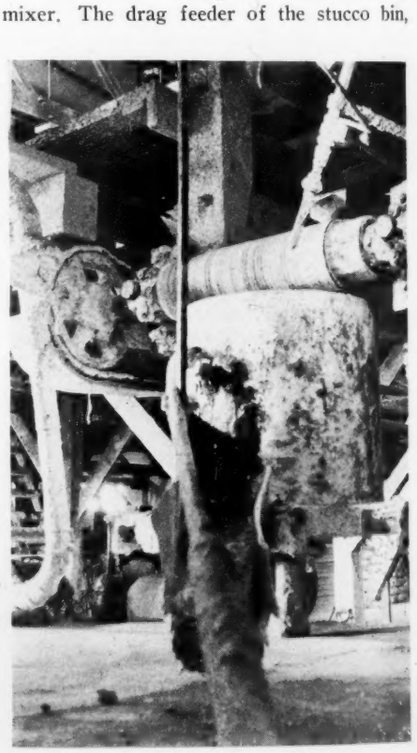
stucco falls to the hot pit, where by screw conveyor and elevator it is carried to a special regrinding mill. The calcined gypsum is ground to about 98% through 100 mesh.

The stucco from the grinding mill passes either to a storage bin or a screw conveyor feeding a belt running to other bins in the wallboard mill. The storage bin is drawn upon for stucco to make the many varieties of mixed plaster produced which include hard wall plaster, finish plasters, fibred plaster and Insulex. To make the special plasters, a regulated amount of stucco is drawn to a batch bin resting on a 1-ton Fairbanks automatic electric scale. Other ingredients such as hair, fibre, asbestos and retarder are weighed by hand and dumped to the batch bin, after which the whole is dropped through a bottom gate to a Broughton mixer and Bates sackers. The batching bin is so regulated that it cannot be dumped until all the proportioning is completed, thus obviating any possibility of leaving out any of the ingredients. The major portion of the mixed plaster, the stucco, is drawn from overhead bins, the recording scale being set to signal when the right amount has been passed to the batcher. The screw conveyors under these bins, the Broughton mixers and the Bates packer are all operated from a Crocker-Wheeler 50-hp., 867 r.p.m. electric motor through jackshafts and pulleys.

There are two stucco bins in the wallboard plant, one of 20-ton and the other of 40-ton capacity. The latter bin is fed by an 18-in. belt conveyor 150 ft. long from the regrinding mill; the drive is a 5-hp., 900 r.p.m. Crocker-Wheeler motor through belt and pulley. The 20-ton bin is elevated and rests on the same superstructure as the soak belt, starch kettle, hot water boilers, etc. Stucco is drawn from the bottom of this bin by a drag conveyor to the soak belt, where it is combed in furrows and drawn in the usual manner through the water section. The soak belt is 30 ft. long by 48 in. wide, the center section troughed to give a water section of about 20 ft. Water is admitted to the section at 110 deg. F. and kept at a constant level by a hand regulated float. Generally the stucco takes about 50 seconds to pass through the water section. The soaked stucco discharges from the soak belt to a cross belt feeding the board machine mixer. The drag feeder of the stucco bin, soak belt and cross belt are operated as a unit by a 5-hp. motor and Reeves No. 1 variable transmission.

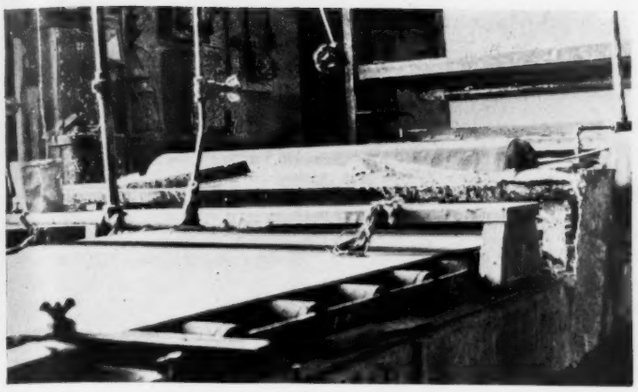


Stucco bin, drag feeder and soak belt on the superstructure above the wallboard machine

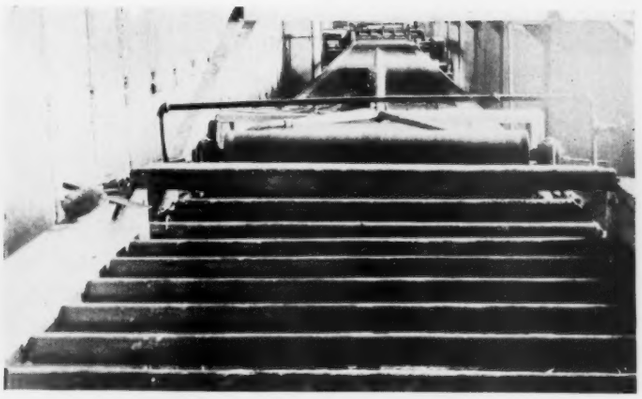


Continuous-type mixer for preparing stucco plaster for the board machine. The cross belt feeding the mixer shows above and the pipe at the upper right feeds hot starch solution to the mixer

The mixer is of special design and of the continuous type and after receiving the wet stucco mixture and a little hot starch solution gives the whole a short mix and then discharges to the bottom paper on the board



Section of the board machine just after the squeeze rolls



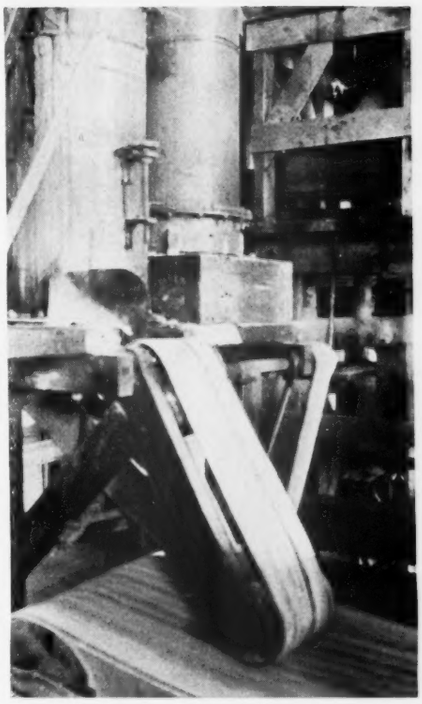
Sizing spray and roll spreader

machine. The use of starch in the manufacture of board is licensed from the Universal Gypsum and Lime Co., Chicago, Ill.

The continuous mixer is driven by a 3-hp., 1140 r.p.m. motor and Reeves No. 3 transmission. The board machine has the usual rolls over which the bottom and top papers pass, but at the same time has some extra attachments because of the folded edge wallboard which it makes. The squeeze rolls are about 12 in. in dia.; one top and one bottom at the point where top and bottom papers are drawn over the enclosed stucco and another about 5 ft. from this point. This arrangement is somewhat different than observed at other plants. Before passing to the rolls, the edges of the paper are ground thin by emery wheels so that after folding there will not be an undue thickness. A special starch solution is used to seal the edges and this is placed on the paper by jets, after which the edges are turned and pressed firmly to the board by the clearing roll.

Wall Board Machine

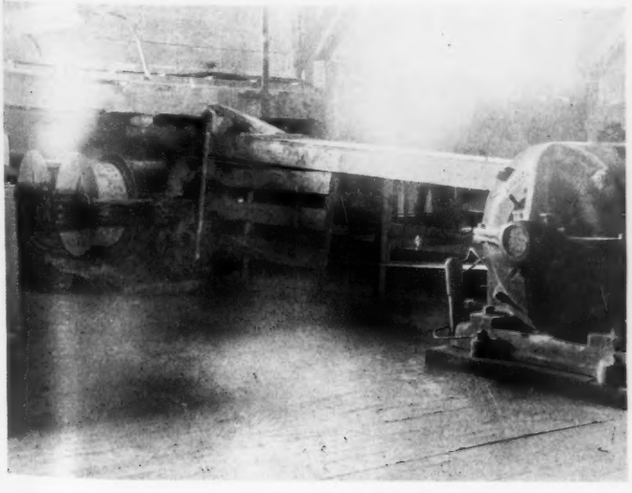
The board machine comprises three sections: the first, nearest to the squeeze rolls, is 125 ft. long, the second or middle section of 200 ft. and the third of 125 ft. All three sections have ball bearing idlers of steel



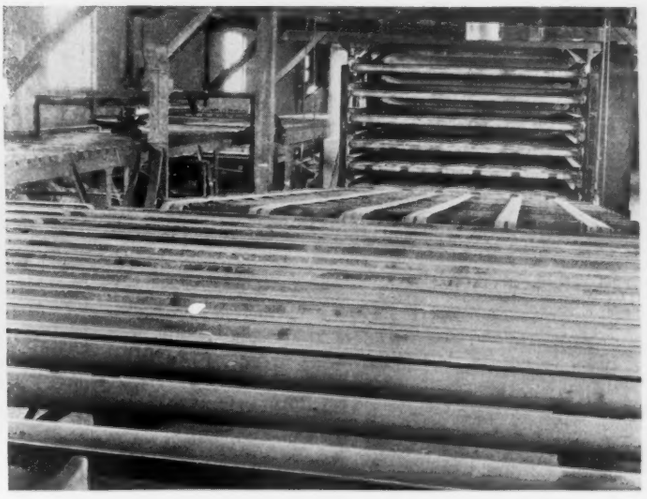
An essential part of the wallboard manufacturing process at this plant

coated with aluminum paint, but the first section also carries an endless rubber belt, 48-in. wide, on which rests the board in the initial forming process. As the green board is drawn along this section the edges are turned, and the board subjected to an ironing process by the ironing belt located about 25 ft. from the squeeze rolls. The ironing belt is simply an endless rubber belt, 80 ft. on centers, placed over the board machine and so adjusted that a 15-ft. section equipped with steel bottom rollers exerts a smoothing pressure through the rubber to the board as is passes underneath. It is driven in a direction opposite to the progress of the wallboard machine. About 150 ft. from the squeeze rolls there is a gravity take-up, the take-up pulleys being located in a pit beneath the board machine at this point.

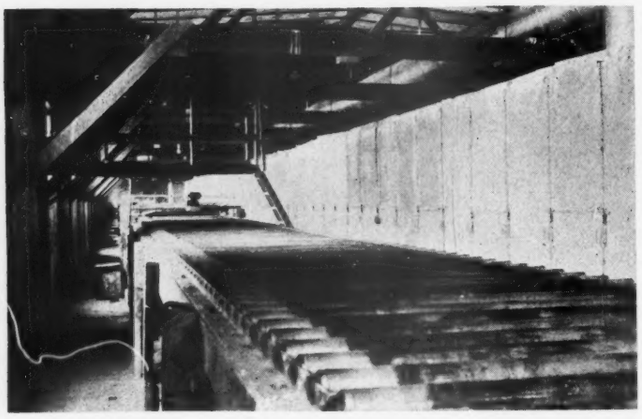
The bottom board as it progresses along the board machine passes through a sizing bath and at the same point the top is treated with a sizing spray, rubbers rollers being used to spread the sizing material evenly over the board. The size is a borax-casein solution specially prepared at the plant and placed in tanks about 50 ft. away from the cutoff end of the machine. After sizing, the board is cut into desired lengths by an automatic Knowlton cutter operated by a



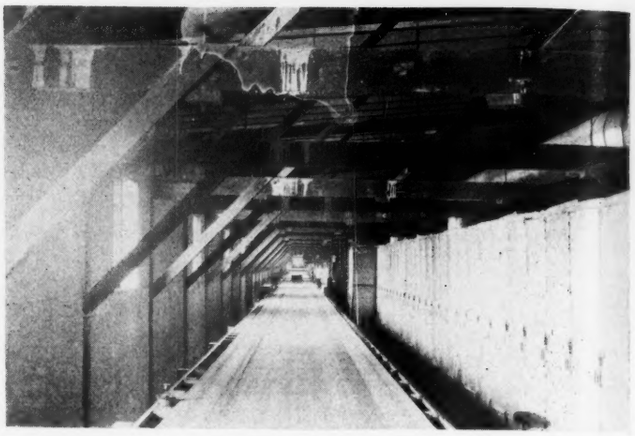
Main drive of the wall board machine



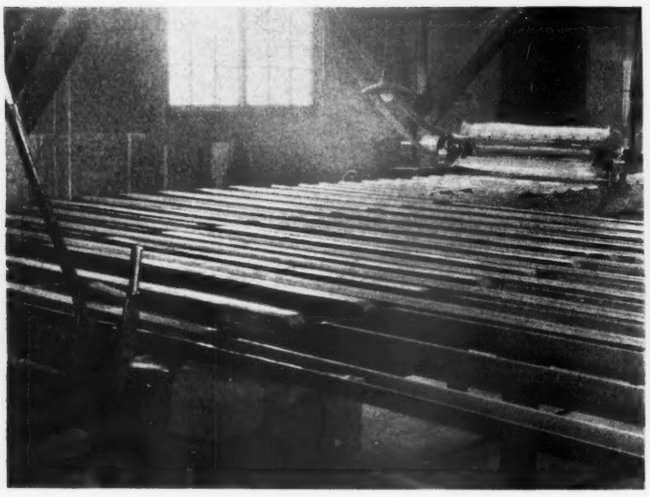
Transfer table and feeder to the tiers of the dryer



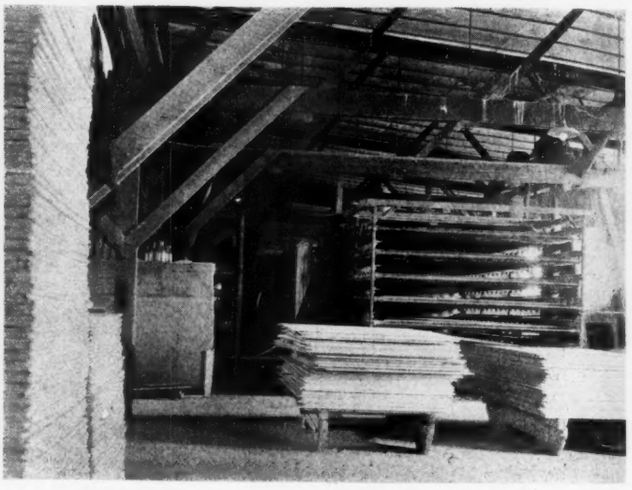
Looking along the board machine. The dryer shows above the right



The wallboard machine as seen from the cut-off end



Transfer table and shifting lever (left). The rotating cleaner for the cut boards shows at the upper right



The take-off end of the dryer and finished board stacked on wooden skids

5-hp., 770 r.p.m. electric motor and Reeves No. 000 variable transmission. After passing the cutter, the board lengths have their top surfaces cleaned by a rotating cleaner. This cleaner is a home-made device resembling the cutting blades of an ordinary lawn mower except that canvas strips are used to sweep the board; these strips move tangentially towards the board.

The entire board machine is driven as a unit through geared line shaft, chain and sprocket connected to a Crocker-Wheeler 25-hp., 750 r.p.m. electric motor and Reeves X-59 variable transmission. It is 500 ft. long, the last 50 ft. comprising an idler section on which the cut lengths move to the transfer table. The entire construction of the machine was carried out at the plant following the company's own design. Inspectors are stationed at various points along the machine and an overhead signal cord runs the entire length, to permit the inspectors to inform the control man at the starting end to make adjustments in the speed of the machine.

Operation personnel at Montreal plant—left to right: Thos. F. Robinson, superintendent; B. A. Horne, general foreman; Norma Horsley, clerk; C. L. Rhodes, chemist; Charles Werth, Board plant foreman; Gordon Lauterman, shipping clerk

The transfer table is of the type generally in modern board plants and was furnished by the Coe Manufacturing Co., Painesville, Ohio. It is driven by a 15-hp. motor and belt and puulley. The Coe dryer is 250 ft. long and has six tiers; its capacity is about 80,000 sq. ft. per 12 hr. day, the board machine being accordingly regulated to supply this amount. Steam for the dryer is generated in an Erie City 250-hp. boiler, coal fired. Three Bristol recording thermometers, one for each section of the dryer, record the dryer temperatures. The dryer is driven by a combination of a 5-hp., 927 r.p.m. electric motor, Reeves No. 1 variable transmission and a Coe transmission. Hot air is blown into the dryer by

two Sturtevant No. 10 fans, each driven by a 40-hp., 1250 r.p.m. motor. The exhaust air is removed by another Sturtevant No. 10 fan, also driven by a 40-hp. motor.

The dried board on removal from the dryer are placed on wooden skids for carriage to other parts of the plant or to the cars for loading. A Yale electric truck transfers the loaded skids about the plant. The boards rejected by the plant inspectors for regular sale as wallboard are cut to 16x 48-in. size and sold as gypsum lath.

The distribution of employes throughout the board plant is as follows: Two men at the squeeze rolls; two for intermittent inspection of the board while on the machine; one man at the cutoff knife; one man at the transfer table; two men at takeoff end of the dryer; one man operating electric truck; three or four men engaged in miscellaneous work, loading cars, cutting lath, etc.—a total of about 12 men.

Testing Laboratory

The company maintains a small testing laboratory in which some physical testing is carried out. The Canada Cement Co.'s laboratory is used for breaking tests and other tests requiring special equipment. C. L. Rhodes, chemist, is in charge of the laboratory.

The main office of the company is at Paris, Ont. R. E. Haire is president; C. R. Whitby, vice-president, and S. H. Reid, secretary-treasurer. The operating personnel at the Montreal plant comprises T. F. Robinson, superintendent; B. E. Horne, foreman, and C. L. Rhodes, chemist.

Is Cement Just "Cement"?

(An editorial in *Railway Engineering and Maintenance*)

TWENTY-FIVE years ago the usual excuse for poor concrete was "bad cement," but with the better knowledge of concrete that we have today, we know that there are other reasons for concrete failures and that the cement must often have been unjustly blamed for defective concrete. Still, the fact remains that the manufacture of portland cement was not always as highly developed or as carefully controlled as it is today, and undoubtedly "bad cement" sometimes got into concrete a generation ago. There is, of course, little excuse for the use of defective cement today. With standard specifications universally recognized and with standard tests for their application, the user is almost certain to secure, in the portland cement he buys, at least the minimum requirements demanded by the specifications.

Such assurance has become so well established in the minds of the users of concrete that to many of them, portland cement is just "portland cement," and they are perfectly willing to have one brand substituted for another. Of late, however, certain new developments have presented themselves which have given rise to some definite questions with respect to this assumed uniformity in the properties of portland cement. Men are beginning to ask themselves whether one brand is just as good as any other under all circumstances or conditions of use, and occasionally ask whether portland cement as manufactured under the standard specifications is the most suitable material for certain particular uses—for example, for concrete in sea water. No conclusive facts have been brought forth which throw any definite light on the latter query, but data, presented in a report made before the American Society for Testing Materials, show that there are definite differences in the behavior of different brands of portland cement in concretes exposed to sulphate waters.

A new factor has been introduced with the advent of special hydraulic cements capable of producing concrete having a strength, in 24 hours, approaching that of portland cement concretes at the age of 28 days. The many opportunities for economies in railway, highway and other construction operations of especially difficult characteristics, through the use of such cements have been recognized and they have had wide use. Following the introduction of these special cements, certain manufacturers of portland cement directed attention to the possibility of obtaining accelerated strength with the use of their products by employing lower water-cement ratios, i. e., richer mixes. Still more recently it has been shown, as the result of a series of tests, that certain accelerators, such as calcium chloride, have more effect in increasing the strength of concrete with the use of some brands of portland cement than they have with others.

These and other developments serve to spur the users of cement to a more critical attitude. While recognizing the unquestioned advantage of a standard specification for portland cement, by virtue of which the cement is largely eliminated from among the variables affecting the quality of the finished concrete as applied to most ordinary purposes, he ought to be on the lookout for the cement which will serve his purpose the best under special conditions.

Asbestos Activity in South Africa

ASBESTOS companies are springing up in every direction, and if the estimates of profit are anything like correct it is folly to keep money invested in gold mines when asbestos is just round the corner offering people fortunes.

A company is being floated in the Transvaal with a capital of £250,000 to consolidate and develop several important asbestos-bearing properties in the Pietersburg district. The name of the new company is Premier Asbestos Mines of South Africa, Ltd., and the directors are well-known men, including A. T. Lloyd (chairman of the Johannesburg Stock Exchange). The purchase price of the properties, comprising 2,216 claims, is £120,000; the underwriters will receive £20,000, and the promoters £10,000, leaving £50,000 for working capital and £50,000 in reserve. The whole of the capital has been underwritten in Johannesburg, and 680,000 shares will be offered to the public at par. This will be the first invitation to the public to participate in the flotation of a Transvaal asbestos company. All the other asbestos companies formed in that province obtained their capital by private subscription, and their shares were placed on the market at a substantial premium.

Deposits Reported to Be Good

Favorable reports have been received from the experts, who consider it is a very fine property with both blue (crocodolite) and white (amosite) asbestos. Assuming that the prices of both blue and white are maintained, the property should return very handsome profits per ton of fibre recovered for many years to come. "No fibre produced elsewhere is superior, and very little is equal to the qualities of the blue and amosite on these areas," say the experts.

This is no doubt satisfactory for the man of moderate ambition, but for the man who wants his profits in big chunks it would seem that the African Asbestos Trust, Ltd., which financiers in London are taking such a keen interest in, is the one to direct attention to. It was floated in London with a capital of £500,000 in £1 shares, and the property is in the Carolina district about 150 miles northeast of Johannesburg. W. F. H. Dudgeon, a well-known mining engineer, has examined the property, and states that the asbestos is chrysotile (the most valuable variety), and is of excellent quality. Hobdell, Way & Co., of London, have reported upon samples, and state it is a chrysotile of very high quality, especially suitable for spinning of every class of asbestos yarn, and they estimate the present market price to be £120 per ton delivered c.i.f. English port. Up to date eight lodes have been located, and Mr. Dudgeon estimates that, reckoning the tonnage at 1,000,000 tons, and the fibre yield at 6 per cent, the total fibre yield would be 60,000 tons. Of this he considers that 80% can be classed as No. 3 shingle stock valued at, say, £20 per ton, and 20% as textile averaging £80 per ton. This gives a total of £1,920,000. "An output of 10,000 tons of rock monthly is expected by the end of this year, and after all allowances the mill should produce 600 tons of fibre monthly, yielding a net profit of not less than £15 per ton of fibre, after paying working and realization charges. On this basis, by about the end of 1929 a net profit at the rate of about £110,000 per annum should be assured." Surely no one can desire anything better than this? But if they should, it may yet be found among the dozen or so other new ventures which are getting ready for the flotation stage.—*The Mining World and Engineering Record* (London, England).

Secret Violation of Trade Rule Is Said to Be Unfair

Federal Commission Declares Clandestine Practices Constitute Unfair Competition

THE CLANDESTINE VIOLATION of a trade practice conference rule by one who has openly subscribed to that rule, is an unfair method of competition within the meaning of the Federal Trade Commission act, according to a statement made public by the commission, October 20.

In the future, the secret violation of those rules which have been accepted by the commission simply as an expression of the opinion of the industry that the use of such practices constitutes unfair methods of competition, will call for action by the commission, even though the practice condemned by such rule has not heretofore been held violative of the act by the commission or any court.

Position Is Outlined

The commission's position in regard to trade practice conference rules which it has not approved affirmatively, was set forth in a letter to the secretary of the Western Door Manufacturers' Association, William L. Rawn, regarding rules drawn up at the trade practice conference of the millwork industry.

After explaining that trade practice conference rules are placed into two groups by the commission, group 1 containing those violation of which, *per se,* constitute unfair competition and warrant proceedings by the commission, and group 2 containing rules condemning practices with regard to the legality of which the commission expresses no opinion. The commission in its letter to Mr. Rawn states definitely that:

Classed as Unfair

"It is a matter of public importance that the question of the enforceability of group 2 rules be judicially determined. To expedite such determination, the commission has taken the position that the clandestine violation of any group 2 resolutions by one who has subscribed thereto in the consideration of like subscription by others in the industry is in and of itself an unfair method of competition, calling for action by the commission, even though the practice condemned by such rule has not heretofore been held violative of the act by the commission or any court."

Members of an industry who have not subscribed to group 2 rules, will not have these rules enforced against them "unless the commission, in considering a specific complaint, should conclude that a proceeding could be sustained under the act regardless of the rule."

Two Members Dissent

The commission's position on group 2 rules was first taken on trade rules for the cottonseed oil mill industry. In this case, however, one of the rules in group 1 specifically made the violation of rules in group 2 an unfair method of competition. The commission's stand in the letter to Mr. Rawn extends its position to all trade conference resolutions received by the commission in group 2.

Two members of the commission, the chairman, W. E. Humphrey, and Commissioner G. S. Ferguson, dissented from the rule in group 1 of the cottonseed oil mill conference resolutions making the clandestine violation of group 2 rules an unfair method of competition. In a dissenting opinion Chairman Humphrey declared that the action of the majority of the commission attempted to make unlawful what was not unlawful before.

Amplifying his position as a member of the majority of the question involved, Commissioner A. F. Myers, in a statement issued October 20 declared that Chairman Humphrey "overlooks the very foundation of the commission's position, which is that the secret evasion of an obligation openly professed is in itself unlawful, even though the practice involved has not heretofore been held unlawful by the commission or any court."

Commissioner Myers further states that only the secret violation of the resolution is prescribed, declaring that any person may at any time withdraw from the agreement, which reads as follows:

"In consideration of the abandonment by others in the industry of practices covered by rules resulting from a Trade Practice Conference and for the purpose of placing as near as may be all in the industry on an equally fair competitive basis, the undersigned hereby subscribes to, and the undersigned and such others as now have subscribed or in the future shall subscribe, hereby mutually agree to abide by said rules, copy of which has been received and read by the undersigned."

Sole Question of Issue

The memorandum by Commissioner Myers on the enforcement of trade practice conference rules for the millwork industry, which discusses points raised by Chairman Humphrey's dissenting opinion, follows in full text:

"The sole question of issue is: Does the secret violation of a trade practice conference rule by one who has openly subscribed thereto, and led his competitors to believe that he will abide thereby, constitute an unfair method of competition within the meaning of Section 5 of the Federal Trade Commission act?

Fallacy in Memorandum

"The commission could not withhold a complaint in such a case without condoning a dishonest practice involving the elements of deception, bad faith, fraud and oppression which are the indicia of a violation of the act. (Federal Trade Commission v. Gratz, 253 U. S. 421.)

"The fallacy in the dissenting memorandum consists in the assertion that the commission by this procedure is attempting to make unlawful something that was not unlawful before. This overlooks the very foundation of the commission's position, which is, that the secret evasion of an obligation openly professed is in itself unlawful, even though the practice involved has not heretofore been held unlawful by the commission or any court. Any person can withdraw from his agreement at any time; it is only the secret violation of the resolution that is proscribed.

Subject to Judicial Review

"There is no basis for the assertion that the position taken by the commission involves a usurpation of the legislative function. The commission is the creature of Congress and cannot exceed the powers lawfully delegated to it. Any action it may take under the policy just announced will be subject to judicial review. If the commission's position is sustained by the courts, the only fault to be found is that it delayed so long the exertion of its full authority under the law. If the position is not sustained, at least a mooted question will be laid to rest.

"The suggestion that American business men will not enter into trade practice conferences unless the right is reserved to them to secretly violate the resolutions they have openly adopted and agreed to observe, is one which I do not seriously entertain."

The letter from the commission to Mr. Rawn follows in full text:

Further Reply

"This is in further reply to your letter of the 7th ultimo, previously acknowledged by the secretary, inquiring:

"(1) As to the significance of grouping rules and the effect, particularly, of placing rules in group 2;

"(2) As to the steps which have been taken to put into practice the rules of business conduct adopted by the Millwork Industry at the Trade Practice Conference held for it on May 15, 1928, at Chicago;

"(3) As to the date upon which rules become effective;

"(4) As to whether the commission will require 85% of the Millwork Industry to accord its approval before definitely informing these interests that the rules are effective; and

"(5) As to whether an individual may make application in re violation of such rules.

"(1) Group 2 rules are those which the commission affirmatively approves, thereby declaring, in effect, that all parties engaged in the practices condemned thereby are using unfair methods of competition within the meaning of the Federal Trade Commission act and are subject to be proceeded against by the commission.

"Group 2 rules condemn practices with regard to the legality of which the commission expresses no opinion, the rules being received by the commission as expressing the opinion of the industry that the use of such practices constitutes unfair methods of competition.

"It is a matter of public importance that the question of the enforceability of group 2 rules be judicially determined. To expedite such determination, the commission has taken the position that the clandestine violation of any group 2 resolutions by one who has subscribed thereto in consideration of the like subscription by others in the industry, is in and of itself an unfair method of competition, calling for action by the commission, even though the practice condemned by such rules has not heretofore been held violative of the act by the commission or any court.

"Commissioners Humphrey and Ferguson did not concur in the position taken by the commission in the foregoing paragraph, being of opinion it is beyond the power of the commission.

"As to the minority members of an industry who refuse to subscribe to the group 2 rules, it is not now apparent how such rules could be enforced against them, unless the commission, in considering a specific complaint, should conclude that a proceeding could be sustained under the act regardless of the rule.

"The public interest dictates that no rule should be received by the commission which would work an undue hardship on the public or on one who has agreed to abide thereby. Such a rule, if not rejected by the commission in the first instance, would be disapproved when its true character became known.

Must Lack Hardships

"(2) (3) (4) The official anouncement of the approval of the rules of the Millwork Conference, dated July 19, 1928, was the first step taken by the commission towards putting such rules into effect. This was the effective date of the rules so far as the commission is concerned. Group 2 rules, to be effective as to individual members, must first be agreed to on forms provided by the commission or openly manifested in some other way. The commission has no hard and fast rule postponing the effective date of the rules until 85% of the industry have subscribed thereto.

"(5) Individuals having information of a substantial character tending to show a violation of any of the rules of the conference may submit the same to the commission."—*United States Daily.*

Relation of Voids to Grading in Gravel

THE FIRST PUBLICATION from the research laboratory established last spring by the National Sand and Gravel Association has been published recently. It is a preliminary report on the first series of tests outlined before the summer meeting of the board of directors. The author is Stanton Walker, director of the engineering and research division, and the tests were by C. E. Proudley, the association's testing engineer.

The investigation reported was undertaken to show the relation between the percentage of voids and variations in grading of gravel. Its practicality, as explained in the first paragraph of the report, is that a difference of 5% in voids may make a difference of 3% to 5% in the amount of cement needed and hence the aggregate with the lowest void content will be the most economical if the strength is satisfactory. The tests reported are stated to be preliminary to tests that will investigate the effect of grading on the compressive and transverse strengths and the yield of gravel concrete, and they are not conclusive although they give valuable information for one type of gravel on the effect of grading on the weight per cubic foot and void content.

The material tested was washed Potomoc river gravel, which was screened to the following sizes:

No. 1. Passing No. 4 and retained on No. 8.
No. 2. Passing ⅜-in. (square), retained on No. 4.
No. 3. Passing ¾-in. (square), retained on ⅜-in.
No. 4. Passing 1½-in., retained on ¾-in.

The No. 1 size was used in only eight of the 57 tests and it was used in these to represent a tolerance of fine material that might be permitted in some cases. The No. 2, No. 3 and No. 4 sizes were combined in three ways, the first combinations being made with only one or two sizes. Additions of one size were made to the other size in increments of 10%. The next series were combinations of No. 2, No. 3 and No. 4, varying from 80-10-10% to 10-10-80%, and the third began with a 60-30-10% combination and followed with miscellaneous gradings. The fourth contained additions of from 10% to 30% of the tolerance material to other gradings.

Weights per cubic foot of the different gradings were determined for dry and loose and dry and rodded conditions, using A. S. T. M. methods. The tables show that one weight follows the other only in a general way, the difference being easily noticeable in the diagrams. The volume of solids was determined by multiplying the weight of 1 cu. ft. of water by the specific gravity of the gravel and dividing the result into the weight per cubic foot. Subtracting the decimal fraction obtained from 1 gave the volume of voids, and this multiplied by 100 gave the percentage of voids. All the results were plotted on triaxial diagrams and the report explains how these are to be read.

Mr. Walker has deferred a discussion of the results until a full report is published, so it would not be proper to discuss them here. It seems permissible, however, to point out some details that are shown by a cursory examination of the tables and charts.

The greatest weight per cubic foot, 113.8 lb., contained 20% of the tolerance mixture; No. 1, 10% of No. 2, 35% of No. 3 and 35% of No. 4. The least weight, 99 lb., was with 100% of No. 2 (⅜-in. to No. 4 mesh). The greatest weight for three sizes combined, 112.1 lb., contained 30% of No. 2, 10% of No. 3 and 60% of No. 4. The least weight for three sizes combined, 102.7 lb., contained 80% of No. 2, 10% of No. 3 and 10% of No. 4.

The triaxial diagrams show a series of somewhat elliptical curves, each of which represents the same weight per cubic foot or the same percentage of voids. This indicates that an infinite number of gradings have the same weight per cubic foot and void content. However, the curves are concentric about a point which indicates approximately 65% of the coarsest size (1½-in. to ¾-in.) and 35% of the finest size (⅜-in. to No. 4). This shows that as a general rule the weight per cubic toot increases with the percentage of coarse size up to a point where the fines come nearest to filling the voids. After that point is passed the weight decreases. The curves are similar to those found for the voids and grading of asphalt sand. (See ROCK PRODUCTS, June 9, 1928, for abstract of paper by Prevost Hubbard on this.)

The report is a valuable contribution to our knowledge of gravel. The practical man, the producer, can study it and perhaps improve his product by slight changes in the grading. It is not always the addition of coarse material that raises the weight. One diagram shows that a mixture of 30% coarse, 50% medium and 20% fine has the same weight per cubic foot (109 lb.) as a mixture of 80% coarse, 10% medium and 10% fine. At some plants one of these might easily be obtained, while the other would be impossible.

American Concrete Institute Proceedings

THE proceedings of the Twenty-fourth Annual Convention of the American Concrete Institute have been published by the institute at 2970 West Grand Boulevard, Detroit, Mich., and are now available for distribution. The price of the book to nonmembers is $10.00. The whole business of the convention, held at Philadelphia, Penn., February 28, 29 and March 1st, 1928, is bound in this one volume of 882 pages which includes a summary of proceedings, reports of special committees and 34 different papers presented at the meetings.

The 25th annual convention of the A.C.I. will be held at Detroit, Mich., February 12, 13 and 14, 1929.

A High Calcium Limestone Quarry in the World's Greatest Cement Rock District

Andreas Quarry Company, Allentown, Pennsylvania, Exploits What Was Once Considered Worthless Rock

THERE ARE MANY DEPOSITS of cement rock in the Lehigh Valley but comparatively few of high calcium rock. One of these is very close to Allentown, in the very center of the Lehigh cement manufacturing district. According to George W. Gosser, president of the Andreas Quarry Co., his stone analyzes 97.31% calcium carbonate. Adjacent to it is a deposit of 96.21% silica sand. With changing conditions in the portland cement industry these deposits may some day come to be as highly regarded as the natural cement rock is today.

Mr. Gosser sends us the following story from a local newspaper:

"'Thar's gold in them hills.' . . .

"So might Jonas Leichneider have thought way back in 1835 when he noticed rich deposits of limestone on his property near Andreas and built the first lime kiln there. So might have a dozen owners of the land and operators of the quarry thought since that time as they quarried the dark rock which they used and discarded the whiter veins of stone. The quarry supplied most of the demands of the surrounding section while the various owners serenely went about their daily work until George Gosser, of Allentown, inspected the white rock they had discarded and found it to be a practically 100% calcium carbonate rock. While the darker rock, bearing between 80 and 90% calcium carbonate was being quarried and used, the purer rock was being discarded as useless. Searching for the gold, the diamonds were missed.

Development of the Deposit

"Today the Andreas Quarry Co. is at the beginning of a great future. Crushers; narrow-gage rails to carry the rock from the quarry to the crushers; a large hydrating plant; a sand quarry—all form the nucleus of what assayers consider the richest deposit of limestone rock in this section.

"When Mr. Gosser first picked up some of the discarded rock and had it analyzed, then gained options on the land, the quarrying was carried on by just one owner, while the tract containing the rock was owned by about a dozen different people. Options on the property of the various owners were soon realized, and Messrs. Horn and Gosser, organized as the Andreas Quarry Co., secured the entire hill, in addition to an older and less productive quarry on the other side of the stream. The 327 acres of their land extend to the Lehigh Valley railroad tracks at Andreas, thus furnishing an excellent railroad siding. Immediately they began work on getting equipment to properly quarry the rock to increase production. Erecting a large stone crusher, they meet the demand for crushed stone and limestone dust, or agricultural limestone. The construction of a narrow-gage road will speed up the conveyance of the rock from the quarry to the crusher. Newer methods of slaking and packing the burned lime increase the production of the hydrating plant. It was not until March of this year that enough of the work had been completed to allow production to start, and even now it is not all completed, but will be very shortly.

"Nearby, but on the company's property, an excellent deposit of silica rock was found, so a sand crusher was installed and has become as busy as the other part of the plant.

The limestone quarry of the Andreas company in the Lehigh valley in Pennsylvania

The rock-crushing plant which is being connected to the quarry by a narrow-gage railroad

The silica sand pit of the Andreas Quarry Co., near the limestone quarry, with the washing plant to the left

A pure clear spring furnishes abundant water for washing the sand, which, even without washing, contains only a very small ratio of loam.

"The rapid development of the property by the new owners, and the high grade of the rock and sand upon their land, has brought a number of prospective purchasers seeking the land for a cement plant."

John T. Dyer Quarry Co. Has Get-together Barbecue

By H. H. GUMPERT
John T. Dyer Quarry Co.

THE John T. Dyer Quarry Co. of Norristown, Penn., operating quarries in the vicinity of Birdsboro, Penn., arranged a big outing for the employes of its three quarries, to be given at its athletic field at Monocacy, Penn., on Saturday, September 29. All preliminary arrangements had been made to entertain the employes with plenty of good eats and sports of every description.

Among other things, a real old-time barbecue ox roast was arranged. But at 6 a. m. on the morning of September 29, "Old Man Jupiter Pluvius" entered on the scene and delivered what he considered was a complete solar plexus knockout to the whole affair by sending a downpour of continuous rain. But the committee on arrangements refused to take the count and immediately got busy. They rented the largest hall in Birdsboro, made extensive decorations with American flags and safety slogans, and converted the "outing" into an "inning." Then they proceeded to carry out the entire program as successfully as though it had been one of those most beautiful days in June of which the poets sing. The affair proved to be a success in every detail, as each of the quarries was represented 100%; also, the officials and office force from the main Norristown office were all present.

A vote of thanks was tendered to the company president, Frank T. Gucker, who sponsored the "outing." The committee for arrangements was headed by Wm. A. Kelly, superintendent of the Monocacy plant, assisted by Harry Schwartz and Louis Holstein of the Trap Rock plant, and Levi Carson and Heister Eshelman of the Clingen plant.

Mr. Kingston of the Metropolitan Insurance Co. gave a brief talk on "Americanism and Naturalization." Each foreign-born naturalized citizen was presented with a small American flag, as was also each unnaturalized alien. Mr. Kingston's talk was greatly appreciated by all present. Music for the afternoon and evening was furnished by H. Frederick's orchestra, rendering quite a number of patriotic airs. Every attendant at the outing was presented with a souvenir by the company.

During the afternoon a number of games were played under the direction of Wm. Sharp, secretary of the local Y. M. C. A. The tug of war was won by the employes of the Clingen quarry. Winners of other events were: 100-yd. dash, Frank Kulp; cork fight, N. Pellicotti; wheelbarrow race, Deltor and Pellicotti; egg race, A. Tavani; balloon contest, B. Wamsher; bag race, Joe Detter; bear race, F. Kulp; three-legged race, Miller and Moore; greased pig, B. Miller; whistling contest, B. Wamsher; gate prize of a pair of field glasses, F. Kulp.

Houston, Texas, to Have White Cement Plant

TRANSFER of the properties of the Gates Chemical Co. at North San Jacinto and Mary streets, Houston, Texas, to the National Portland Cement Co. for a consideration of $50,000 was effected last week when deeds were placed on record here.

The properties consist of a large three-story stone and hollow tile building, 100x200 ft., and its site, acquired last March from George C. Smith for $50,000.

At that time the company established temporary offices in the Second National Bank building, and had plans for the establishment of a $300,000 chemical manufacturing plant to employ 50 to 75 men.

Home offices of the chemical firm are in Denver, Colo., and Alpine, Calif., near Los Angeles.

When the property was acquired, the exact nature of the chemicals to be made was not disclosed, but it was understood that they were to be used in the manufacture of a mixture for cement and building products.

The deed filed for record here last week indicates that the home office of the National Portland Cement Co. is in Dallas. The firm was incorporated under the state laws several years ago with $250,000 worth of stock with no par value. Names of the incorporators were given as Eugene S. Gates, a director; H. J. Harris of Dallas, president, and C. S. Atkinson of Houston, secretary-treasurer.

Before the transfer of the property was made to the cement corporation, it was deeded to Mr. Gates by the Gates Chemical Co., who in turn transferred it to the newly organized firm.

Cash paid in all transactions amounted to $10 and other considerations, while the $50,000 is to be paid in a series of six notes, due semi-annually, at 7%.

It is understood that the chemical company was refused a permit to operate its plant in Houston and manufacture its proposed products, and has decided to utilize its holdings here through the organization of the cement companies by members of the chemical firm and others for the purpose of making a white building cement with high chemical analysis.

The plant will have a capacity of 50 bbl. a day.—*Houston* (Tex.) *Post.*

Florida Cement Company Makes a Good Suggestion

THE Florida Portland Cement Co., of Tampa, has sent to a number of newspapers over the state a suggestion for an editorial based on experiences of that firm.

In the article the official of the company says in part:

"We are manufacturing in Florida a portland cement equal to any in the world—a very broad statement and one in which you should be intensely interested.

"Constantly we are receiving inquiries from prospective industrials 'outside of Florida,' whether the 'home folks' will patronize 'home industry.'

"While the demand for cement for the construction of roads, warehouses, residences, wharves, etc., is at a lower ebb than at any period for the past five years—nevertheless, there is a sufficient demand to keep the 'only cement plant in Florida' running full and thereby giving employment to several hundred Florida citizens.

"Hundreds of stockholders in Florida and many others located in twenty-seven states and the Dominion of Canada showed their 'Faith in Florida.'

"Too many dealers and contractors decide to let the 'other fellow' develop Florida industries.

"The difference between 'Interest in Florida Industry' and indifference will grant employment to over one hundred Florida men and change an industry (already located) to the profitable side of the ledger.

Why reach out for new industries and ignore those already at home?"—*Winter Garden* (Fla) *Journal.*

Hints and Helps for Superintendents

Protecting Belt Drives from the Weather

MANY plants in the rock products field are so constructed that the operating belts driving the different pieces of equipment are not protected from the weather by any means. This is particularly so in sand and gravel plants where to cover the equipment in the plant would add an extra and unnecessary expense. However some protection over the belts will save its cost in the long run by the longer service that the belts will render. A total enclosure around each belt is common, and is undoubedly the best means of providing this protection. However, the accompanying picture of a southern sand and gravel plant shows another method which is both inexpensive and effective. A roof is built over the belt close enough to furnish the required protection, as shown. This may be of boards as in this particular case, or of sheet metal. The covering should be wide enough to protect against any weather condition.

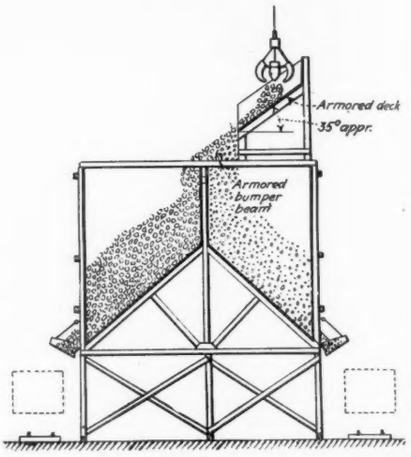
Belts exposed to weather protected by simple method

A Jump Screen

By C. W. TANDY
Winnipeg, Manitoba
(From *Engineering and Mining Journal*)

ON THE Granby Consolidated docks at Anyox, B. C., is a screen that is unique in principle and simple in design. It has long been observed that when solid materials are dumped into a heap the larger pieces tend to settle near the base. This phenomenon may be explained thus: the larger pieces in falling have the greater momentum and are less easily retarded. Furthermore, in consequence of the greater momentum they attain a greater velocity than the smaller pieces in traveling the same slope distance. As a result of this difference in velocity, the trajectory of the larger pieces is longer, a fact which is turned to advantage in the design of the screen.

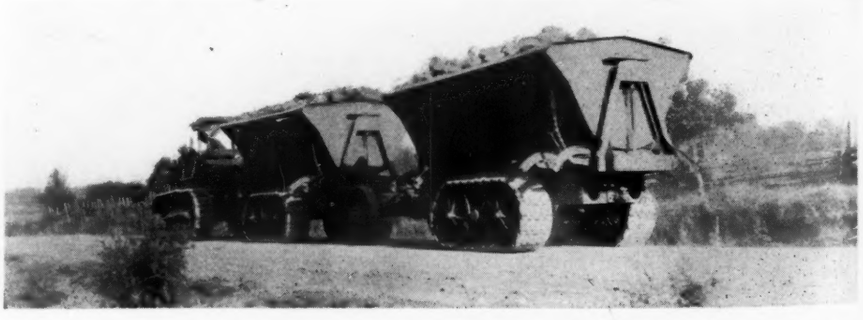
The screen works as follows: The ore is dumped on a moderately inclined plate, not too steep and yet not too flat, and is allowed to gravitate toward a bin divided into two compartments by a partition running at right angles to the direction of the flow. The finer ore drops into the first compartment and the coarser ore jumps into the second compartment. Sorting is roughly done, but is sufficiently close for the purposes intended. The location of the armored bumper beam influences both the size and the proportional amounts of the material delivered to the compartments. The material screened is Maple Bay silica rock, which is unloaded from a scow by an orange-peel grab bucket. Screen products are transported in gondola cars to the smelter for use. Credit for devising the "jump screen" is to be given to J. B. Haffener, a former superintendent.



Separation of large rocks made by greater spread of trajectory

Using Caterpillar Dump Wagons for Hauling from Quarry

AS a means of conveying stone from the quarry to the plant, the Black Marble and Lime Co. of Enterprise, Ore., is using an unusual method which apparently just fits the particular problems of its operation. The quarry is four miles from the kilns and at an elevation 2170 ft. higher so that the haul is almost entirely down grade. At one point there is a hairpin turn on a 28% down grade. To meet these conditions two Athey truss wheel dump wagons have been purchased and are hauled to and from the plant by a caterpillar 60 tractor. Both wagons are hauled at the same time. It is stated that under the conditions that existed during the past winter, it is felt that no other means of transportation would have been safe or even possible. The trucks are of large capacity, side dumpers and their unique method of mounting could be used by many operators who have to haul rock over poor roads where other methods of hauling would possibly fail.

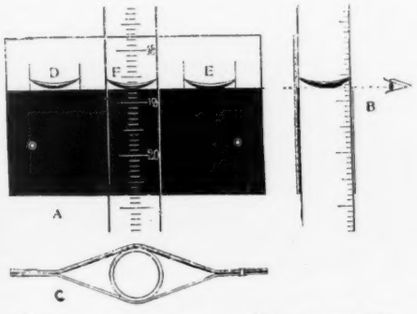


Trucks with caterpillar treads for winter haulage

Burette-Reading Device

IN reading the level of the liquid in a burette, the lower boundary of the dark portion of the meniscus is usually taken as the normal level, and an accurate burette reading requires (1) suitable illumination of the meniscus; (2) avoidance of parallax error. Many devices have been proposed to secure the former and to eliminate the latter. The common plan of holding a white card behind the burette, or the use of a black and white screen, gives perfect illumination of the meniscus, but affords no assistance in eliminating parallax. The device here described is effective in both respects, and is at the same time very simple.

A piece of white celluloid, measuring about 3x1½ in., has two-thirds of its area blackened, as shown in diagram A. Over the blackened portion is placed a strip of transparent celluloid so that its upper edge coincides with the upper margin of the black area and affixed by means of eyelets near the ends—thus leaving an opening between the pieces sufficient to allow the device to be slipped over the burette (as shown in diagram C) and to remain in any desired position.



Extreme accuracy possible in reading burette by use of this device

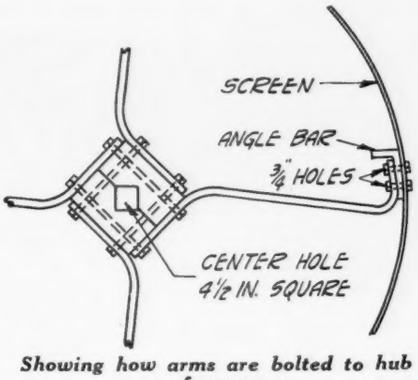
A burette reading is made as follows: The device is placed on the burette so that the upper margin of the black area is just below the meniscus. (The meniscus now appears as a black crescent with a very sharp lower outline.) The eye is brought into the position such that the upper edge of the transparent celluloid (in front of the burette) and the upper margin of the black area (behind the burette) are seen as one coincident line, and the device is then gradually raised until this line forms a tangent to the black crescent of the meniscus. This is shown in diagram B and also at F. The slightest movement of the eye throws the front and back margins of the device out of alignment, while the slightest movement of the device itself causes the meniscus to appear above or below the coincident margins, as shown at D and E in the diagram. After adjusting the device in this manner, the burette reading is obtained by noting the position on the burette of the upper edge of the transparent celluloid. The reading may be made at any time without further reference to the meniscus, provided the position of the device on the burette is not altered; and since the celluloid is transparent and is in actual contact with the graduations, it is easy to read to the nearest 0.01 c.c. with the aid of a pocket lens.

The efficiency of the device was tested by asking nine observers to read the same burette independently, with the result that seven gave the reading as 6.03 and two gave it as 6.02 c.c.

The level of the liquid in a burette can be adjusted to the zero-mark or to any desired graduation in a similar manner and with equal precision; and with opaque solutions, such as potassium permanganate or iodine, the use of the device gives a sharp, black, horizontal line where the surface of liquid is in contact with the glass.—Maurice Hyman, in *The Journal of the Society of Chemical Industry*, England.

A Home-Made Revolving Screen

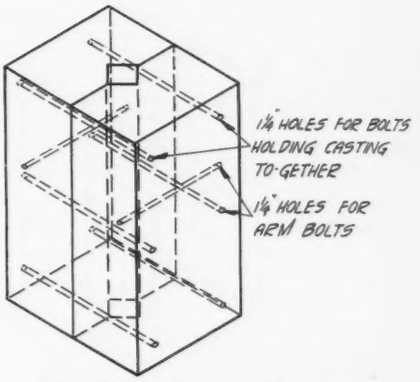
A REVOLVING screen suitable for all ordinary purposes in a crushed stone or sand plant can be made almost entirely at the plant, if the company is provided with a forge shop and ordinary machinist's tools. It is necessary to have castings made at a foundry, but all the other work can be done in the plant shop, and replacement parts can be made in spare time. The two sketches show the central block casting of the spider, which is approximately 8 in. square and 10 in. long. This block is in two pieces with a 4½-in. hole down the center as shown. Holes are drilled at each end of the casting for bolts to hold the sections together, and four more holes are drilled at the middle to bolt on the arms.



Showing how arms are bolted to hub of screen

The arms are made of strap steel 1¼x4 in. in size and are bent in a double curve so that they will bolt to the casting at one end and to the inside of the screen at the other. At the outer ends these arms bolt to angles running the full length of the screen. Four of these angle bars with two or three spiders form the framework on which the screens can readily be bolted.

Screens made in this manner are used exclusively at the crushing plant of the John T. Dyer Quarry Co. at Trap Rock, Penn.

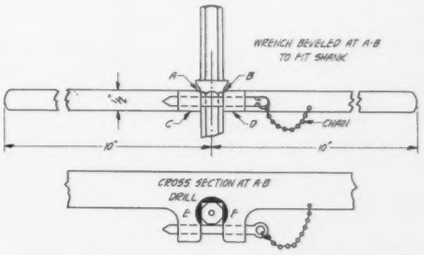


Cast blocks for revolving screen center

Wrench for Removing Stuck Drills

(H. N. Kirk & Co., Keene, N. H.)

POSSIBLY in no other drilling is there such a variety of rock to pass through as in mica mining. At times the drill cuts through soft rock feldspar, and then must change to quartz or mica. A drill hole with a cross section made up partially of soft rock and partially of hard rock will almost certainly be thrown out of line more or less. A four-point drill helps in a great measure to keep the drill hole from following slips or being otherwise thrown out of line. When a drill does become stuck the use of the wrench shown in the illustration will pull it out when the jack fails.



Device used in mica mining to remove stuck drills

The wrench is made to fit the size of the drill being used. Twisting on the tool aids in loosening the drill, and if the drill is still tight, blows applied at the points "C" and "D" will do the work. This saves much pulling and twisting with the drill retainer on the jack.

Home-Made Salamander

A GOOD salamander for heating in crushing plants, etc., can easily be made from an old boiler, such as frequently can be found on scrap heaps around plants and quarries. The boiler should be about 16 or 18 inches in diameter, and should be cut off so that it will stand about 2 ft. high. Four legs are bolted to the bottom, and a hole is bored near the base, through which is passed a compressed air pipe with holes for the exit of the air. The salamander can be set up anywhere that there is compressed air.

The Aggregate Ideal with the Up-Grading of Cement

(An Editorial in the British "The Stone Trades Journal")

THE quantities set out as a definite standard will do for most works, but there are others where strict formula does not apply for the reason that the facts are different and have to be studied by themselves in relation to the use it is required the cement should be put to. It will be found, firstly, that the cement varies and must necessarily be so until the manufacturer has advanced to very much more perfection than up to the present. Secondly, the very aggregate with which the cement has to bond varies even much more than the cement, consequently it will be seen, when a very important job is to be undertaken, the precise qualities and strengths must be thoroughly sought for and kept as far as it is humanly possible to do during their use.

The question of what constitutes the ideal in each case cannot be formulated for the reason that in judging the character of the work which is required, so many conditions enter into the calculations that almost no two jobs are alike when looked at from such a high standpoint as perfection. It may seem to be writing about a subject that common sense would dictate the answer in each case, but it is hardly correct, for the matter is one of the continual research if any advance is aimed at by the cement manufacturer.

Coming Competition to Be On Quality Basis

It is to them that this subject matter is of such importance, for the time is almost at hand when sales will be made on quality more than price for this class of work, and it is to the manufacturer whose research department can give the user of cement the information that will enable him to sell his cement. It will therefor be seen that the manufacture of cement carries with it something else than the production of a material that has to be of such quality that it must pass constantly severe tests to enable the user to be sure he is getting what is specified and what is demanded from him in carrying out works of an important character. The very nature of the work is one that calls for very deep research, because it is one that depends on several factors that are not very easy to determine by rule of thumb, so to speak. Consequently much more will have to be undertaken in the cement laboratory than was the case only a short time back.

The very fact of the cement increasing in quality brings with it at the same time a call for the advance in the quality of the aggregate in order that the two shall combine and show equal upgrade in the result. This brings another point to the front, viz.: —the cement may advance and become much more superior than hitherto, but if the proper aggregate is not brought up to the ideal as far as possible, much of the upgrading of the cement will become lost for all intent and purpose.

Therefore this brings another to be considered, and one which will be much appreciated by the owners of quarries who have materials that are ideal for the correct aggregate in question. There may be not a few who will be in a position to almost hold a unique position of having something what must be obtained, in which case there are two ways of dealing with such an important issue.

The owner may wish to restrict the output in order to gather large returns whilst his material holds the position named, or secondly, the material may be handled entirely wrong with a view of large output at non-remunerative rates.

Now something between the two is necessary, that is to say, the price must not be too low that will prevent the proper preparation of the material for the use to which it is to be put; at the same time the price must be an economic one in order that the best for everyone may accrue.

It will be obvious that the use to which it will have to be put will entail much preparation by the right machinery or plant, and so it follows that care will have to be taken that its manufacture should follow on the lines of the cement chemist, to whom constant reference will be found to be absolutely necessary.

Must Cement Manufacturers Take Over the Aggregate Business Too?

Another matter that also comes into view, being the question whether the cement manufacturers are to be concerned with the production of the right aggregate as part of the process of selling their cements guaranteed under certain conditions, which would hardly be possible unless they had the right or the necessity of selling at the same time the right kind of aggergate in order to complete their guarantee. This seems to imply that the cement manufacturer must needs turn his attention to a new department in self defense.

The view of the user is against the continual reduction in price if it means the reduction of the qualities for which much work has been put in to reach. On the other hand, the user wishes the quality to go up without affecting the price in proportion. If the quality can be raised and the price lowered, so much the better, but the actual result that will be the test, will rest on the quality every time and not with the price. It therefore brings about conditions that will govern the procedure very much, if not altogether, for whilst there is a definite order of going, that is, quality first, price second, then it must follow that such must be the case in aggregates in order to run in double harness with the cement.

It is not difficult to see now how to regard the business in the production of aggregates, for it must be always remembered that they are as important as the cement as being a fellow partner, so to speak, in the combination, without which much different action and reflection would ensue.

The subject is one of curiosity from the point of view that it is only recently, comparatively speaking, that the business of aggregate production has been determined as a distinct branch of quarrying, but now it is beginning to be quite a department in which true scientific methods will have to be adopted in its manufacture in order to keep up with requirements which keep altering as the quality of cement keeps improving. Coming back therefore, to whom the business of aggregate manufacture should belong, it will rest for the quarryman to see what is required of him, or else give way to the cement manufacturer for the progress that is being made with cement must and does demand the same progress from the quarry.

The matter is a very interesting one to review, for it brings out certain facts that will bear upon the present time in the cement market. For instance, the demand is not so great as it was by a long way, that is common property, and when it comes to getting rid of an output which has to be made in order to get the cost down to a reasonable figure, it behoves those interested to think in what way they should proceed in order to keep their sales. The sales, on the other hand, will have to be made in order to retain the routine so diligently and perseveringly made in times of prosperity.

The question whether it is possible to upgrade cement and at the same time reduce the routine will be a question that will have to be discovered in order to keep pace with the times into which the trade is beginning to be faced with.

Duty of 30% Ad Valorem Is Applied on Crushed Gypsum

Decision Brings to End Controversy That Originated with Assessment Ordered in June

THE DEPARTMENT OF THE TREASURY announced October 20, over the signature of the Secretary of the Treasury, Andrew W. Mellon, that it had decided to apply a duty of 30% ad valorem upon imports of crushed gypsum. The rate is that provided by paragraph 214 of the Tariff Act of 1922 for earthy or mineral substances wholly or partly manufactured.

Announcement of the department's decision brought to an end a controversy that originated when the Bureau of Customs ordered crushed gypsum to be assessed at $1.40 a ton on June 12. That ruling was to have been effective 30 days after its formal publication by the department, but the present announcement said that so many protests were received it was found advisable to reopen the case and hear the protests. In reaching the conclusions so announced, the department has considered the arguments advanced by both importers and domestic producers and, the statement said, it was believed a just and proper basis of duty had been fixed.

The original duty, fixed in June, was arrived at by the Bureau of Customs after a study of Canadian tariff classifications and after some reference had been made to other foreign classifications and scientific research.

The department's announcement said the new rate would be effective 30 days after its publication in *Treasury Decisions*. It was in the form of a letter to Collector of Customs at New York and follows in full text:

Hearing Was Granted After Receiving Protests

Sir: In a letter dated June 12, last, the department advised you that in its opinion crushed gypsum was properly dutiable as ground gypsum at the rate of $1.40 per ton under paragraph 205 of the Tariff Act, but as it was the custom to admit crushed gypsum free of duty as crude gypsum you were authorized to continue that practice until 30 days after that letter appeared in the weekly *Treasury Decisions*. However, so many protests were received by the department from importers of crushed gypsum that it deemed it wise to withhold publication of the letter of June 12 and to grant a hearing to importers and others concerned, which hearing was held in the Bureau of Customs on July 20 and was attended by importers and domestic producers of gypsum.

Much testimony was submitted by importers in support of their position as to what is ground gypsum within the meaning of paragraph 205, and samples were filed by them illustrating what in their view is "ground" gypsum and "crude" gypsum, and later briefs were filed by the attorneys representing the importers and the domestic producers. The briefs submitted have been read with care, as well as the authorities cited therein, and have been of assistance to the department in reaching its conclusion as to the correct classification of this crushed gypsum.

As stated above, it is and has been the practice under the present tariff act to admit free of duty crushed gypsum of the character the subject of its letter of June 12 as crude gypsum, but it is the contention of domestic producers that it is dutiable as ground gypsum at the rate of $1.40 per ton under paragraph 205, whereas the importers contend that the crushing of the gypsum is for purposes of expeditious handling and that it is still crude within the meaning of that term as used in paragraph 1643. It has also been suggested that even if it be held that the gypsum is not "ground" as that term is used in paragraph 1643, nevertheless the crushing of the gypsum is a process of manufacture and that the product is accordingly dutiable as an earthy or mineral substance partly manufactured and dutiable at the rate of 30% ad valorem under paragraph 214.

Not Free of Duty as "Crude" Gypsum

As indicated, the department in reviewing the case has given this matter careful consideration and has reached the conclusion that the merchandise is neither dutiable as "ground" gypsum within the meaning of paragraph 205 nor free of duty as "crude" gypsum within the meaning of paragraph 1643. In the opinion of the department the term "crude" gypsum should be limited to that article as quarried and that any process subsequent to that, whether it be merely for convenience in transportation or as the initial process in the complete manufacture of gypsum, does not change the fact that by this process of crushing the gypsum has been advanced in value and improved in condition. Note the decision of the United States circuit court, U. S. vs. Graser-Rothe, 164 Fed. Rp. 205, involving the classification of so-called "granite" or "terrazzo" produced by crushing the waste of marble quarries and sifting or sorting it into various sizes. The court in holding the merchandise dutiable as a manufactured article under section 6 of the tariff act of 1897 quoted with approval the opinion of General Appraiser Howell as follows:

"The merchandise as imported has been converted from a comparatively valueless article into a commodity of use and value by a process of manufacture specially designed for the purpose. Labor and machinery have been used in producing it, and because of the manufacturing process it has acquired a new name and a new use. It is therefore no longer a crude mineral, but is a manufactured article."

While, as stated, the department is of the opinion that this merchandise is excluded from free entry as crude gypsum, it is not in accord with the contention of domestic producers that the mere crushing of the gypsum constitutes "ground" gypsum within the meaning of paragraph 205. In the opinion of the department the association of the words imposing duty on plaster rock or gypsum "ground or calcined" at the same rate indicates that in the contemplation of Congress ground and calcined were substantially the same, at least so far as cost of production is concerned, and it can hardly be presumed that Congress intended to impose the same rate of duty on gypsum which had been merely crushed as upon the last process of manufacture of gypsum, that is, ground or calcined.

For the reasons above stated, crushed gypsum is neither crude nor ground, and in this connection it is deemed pertinent to call attention to the fact that the trade magazine, ROCK PRODUCTS, in its price lists of various products quotes the prices per ton on "crushed gypsum," "ground gypsum," "agricultural gypsum," etc., showing that there is an article well known in the gypsum industry which is bought and sold as "crushed" gypsum.

In regard to the question whether the mere crushing of this gypsum is a process of manufacture, attention is invited to the Rossman case, T. D. 31321, involving the classification of marble chips, in which this language is used:

"If grinding be a process of manufacture we see no good reason for saying that crushing is not equally so. The operations are similar, the main difference being that in grinding the substance treated is more finely pulverized than is ordinarily understood to result from the crushing process. It is rather a difference of degree than otherwise."

Attention is also invited to the decision of the Board of U. S. General Appraisers (now the United States Customs Court), T. D. 37396, which overruled the protest of the importers that stone which had been put through a process of crushing before importation to reduce it in size to pieces from ½ to 10 in. in diameter was entitled to admission free of duty as a crude mineral within the meaning of paragraph 549 of the Tariff Act of 1913, the board holding that it was properly dutiable under paragraph 81 of the said act which corresponded to paragraph 214 of the present tariff act. General Appraiser Hay in this decision stated that the merchandise was an earthy or mineral substance and that although it had to be further crushed before brought to the use to which it was to be put in this country,

and that further crushing process would be done in this country, it was, nevertheless, a partly manufactured article. In discussing this question he used this language:

"It is also clear, we think, from the testimony that if it were shipped from Canada in the form in which it was taken from the earth or in the form in which it is left after the blasting process, it would have to go through the same crusher in this country that it had to go through in Canada before shipment. Hence it would seem clear that it was partially manufactured before shipment. This process increases its value, for it would have to go through the process after it arrived in this country the expense of doing that is saved by its having passed through the process in Canada."

It is true that in this decision the general appraiser held that the merchandise was free of duty, but it was held to be free of duty under another provision of the Tariff Act of 1913; that is, as silicic acid under paragraph 387.

Following the decision cited, and for the reasons stated, the department has reached the conclusion that crushed gypsum is dutiable at the rate of 30% ad valorem under the provision in paragraph 214 of the Tariff Act for "earthy or mineral substances wholly or partly manufactured," and the department's ruling addressed to you under date of June 12 is modified to the extent that 30 days after the date this letter appears in the weekly treasury decisions you are directed to assess duty upon crushed gypsum at the rate of 30% ad valorem under paragraph 214 of the Tariff Act of 1922.

British Portland Cement Agreement May Effect Pacific Coast

AN IMPORTANT AGREEMENT has been arranged between two great British cement groups, the "Blue Circle" and the "Red Triangle." The latter group has been gradually built up during recent years by H. S. Horne through purchases of control and amalgamation of numerous independent units until he was in a position to argue terms with the Cement Markers' Federation, which embraces older combines, including Associated Portland Cement and British Portland Cement.

Among Mr. Horne's companies are British Cement Products and Finance Holborough Cement, Greaves, Bull & Likin, Dunstable Cement, Ship Canal Cement and Associated Anglo-Atlantic Corporation. It is believed that the last named has some interesting foreign cement arrangements in the process of negotiation.—*New York* (N. Y.) *Journal of Commerce.*

Large English cement manufacturers are now looking into possibility of making connections in Los Angeles.—*Southern California Shipper* (Los Angeles, Calif.)

Clarke F. Leh, Superintendent, Three Forks Cement Mills

ALL THE VARIOUS members of the Leh family, which had its American origin in the Lehigh Valley of Pennsylvania, have been and now are in the portland cement industry, according to one well-known member. Clarke F. Leh is one of the latest members of this family to achieve distinction. He is a son of E. U. Leh, for many years general superintendent of the Three Forks Portland Cement Co.'s two plants in Montana; and a nephew of Howard H. Leh, former general superintendent of the Phoenix Portland Cement Co., of Nazareth, Penn., now the Lone Star Cement Co. of Pennsylvania, an International subsidiary; and a nephew of W. H. Kleckner, superintendent of the Newcastle, Penn., plant of the Lehigh Portland Cement Co. Various cousins of Clarke Leh are in cement plants in the Lehigh Valley.

Clarke F. Leh

Clarke Leh is a real Westerner. He is a graduate mechanical engineer of Leland Stanford University, California, and served under J. F. Kaufman in the designing of the new Colorado Portland Cement Co. plant at Boettcher, Colo. He was particularly instrumental in the design of the crushing plant, as well as many other features of the plant, we are told by Paul C. Van Zandt, the chief engineer. He left Boettcher before the completion of the plant to succeed his father in Montana. His headquarters are at Trident.

Clarke Leh's career and history is interesting not only as illustrating the upholding of the Leh family name in the advance of the cement industry, but also in showing the opportunities in the cement industry for young men of technical training and education.

New York State Gypsum Producers Oppose Any Further Canadian Importations

IMPORTS OF GYPSUM from Canada threaten to wipe out the gypsum mining industry in New York state unless tariff relief is given, according to a statement by Theodore Curtis, president of the Empire Gypsum Mining Company of Garbutt.

Gypsum producers between Rochester and Buffalo employed a New York firm of attorneys last fall to bring a proceeding before the United States Treasury Department to classify the Canadian product as ground gypsum in order to protect American capital and workers. On May 12, 1928, the Treasury Department gave a decision to the effect that the mineral being shipped in from Canada was, in effect, ground gypsum and subject to duty. The Canadian ambassador took an appeal from the ruling to Secretary Mellon, who held up the ruling pending the appeal.

In the meantime, according to Mr. Curtis, great quantities of the Canadian gypsum have been poured into the United States and nine concerns between here and Buffalo are facing a shut-down unless something is done to alleviate the situation.

Mr. Curtis' statement, placed in the hands of Judge Harlan J. Rippey, counsel for the New York City law firm of Tomlinson, Herrick, Hopkins and Coates, who have been retained by the gypsum interests, reads as follows:

"This year something like a million tons of raw gypsum is being brought into the United States from Nova Scotia and New Brunswick. It is quarried there and recovered from nature without the high expense of mining required here. It it partly ground or manufactured by cheap Canadian labor and is brought down the coast in vessels and delivered to coast cities at about one-quarter the cost of railroad transportation from here to New York or Boston. Congress intended to impose a duty of $1.40 a ton upon this material and thus protect American industries, but this partly manufactured material is being admitted free of duty. Against this the American manufacturer cannot compete.

"New York state produces nearly 2,000,000 tons of raw gypsum yearly or about one-third of the entire amount mined in the whole United States.

"A great industry, has grown up with millions of local capital invested in promoting it. Probably 15,000 persons are directly or indirectly dependent on it.

"Some plants are working on part time. Before the first of the year under present conditions, most of the plants will be closed or practically so.

"Appeals for a relief have been made to the Department of Commerce at Washington, to the United States Treasury Department and to Congressman Archie Sanders, but without any practical results to date."—*Rochester* (N. Y.) *Times-Union*

Editorial Comment

The Ethics of Competition

The editors have received many interesting comments on the editorial in the September 15 issue dealing with the operation of the laws of supply and demand and of competition. However, the comments are so diverse and irreconcilable that the only conclusion one can draw from them is that there exists a wide difference of opinion; and no clear idea of a specific course to follow. This is but natural, of course, because the problem is complicated and involved; and yet, until the average business man has a fairly clear understanding of it, how can remedial measures be carried out successfully? And this is *the big problem* of all business today.

Fundamentally, it resolves itself, so far as the character of competition is concerned, into an application of laws or rules of moral conduct, or ethics. No man with an understanding mind, so far as we can determine, believes that the operation of the laws of supply and demand, and the survival of the fittest, can be changed by legislation or mutual agreement, *in the long run.* They are as much a part of nature as the law of gravity.

But, while the sum total of human understanding and intelligence can not alter the ultimate results of the operation of the laws of supply and demand and the survival of the fittest, they can temper their immediate application—they can soften the blow—they can make competition less ruthless and more intelligent—they can spread out inevitable losses that some must take in order that the more efficient or more progressive, or more aggressive, may gain, in some proportion to their abilities and their enterprise.

How to do this without killing opportunity and initiative, the incentives to efficiency, progressiveness, or aggressiveness, is of course the kernel of the problem.

Unquestionably, the fact that the public is now the owner, directly, or indirectly (through life insurance policies), of a large share of American industry has brought about a radical change in public opinion, and a radically different point of view respecting the economic problems involved; but the problems themselves are the same as they always have been.

If we were all 100% Christians, or Jews, or disciples of Brahma or Confucius, we would not need statutes, or courts of law to enforce statutes. The moral laws of all these religions, with sufficient will power and intelligence to apply them, would be sufficient. No one would want more than his neighbor, and everything would be lovely. There would be no complaints of cut-throat competition and of price-cutters generally. We probably wouldn't have concrete highways, automobiles, radios, or many other luxuries, conveniences, or present necessities—and we might or might not be just as happy; but that's idle speculation.

Of course, man as an intelligent and reasoning being, normally born with an ambition to excel his contemporaries in anything he undertakes, has had to adjust his interpretation and application of these moral laws, or truths, to his own conscience—his own understanding of right and wrong. And this understanding, in the last analysis, is a factor of his intelligence, his age, and his knowledge and his experience with the world in general.

Fortunately the average business man's knowledge and experience with the world in general have increased by leaps and bounds within the last few years, largely through his stimulating contacts with other business men in associations of business men, and through his greater acquaintance with the literature of the philosophy of industry and business, for both of which business and trade journals are in no small degree responsible. With his larger acquaintance has come a correspondingly greater appreciation and knowledge of the fundamental morals and ethics of business competition, until now many foresighted business men begin to believe that the public no longer needs such statutes as the Sherman law to protect it from monopoly by any unscrupulous business and industry.

This liberalizing of public opinion is evidenced not only in much that is being written and spoken by industrial leaders, but by the increasingly liberal interpretation being put by the courts upon the Sherman law and many similar state anti-trust laws, and by the work recently undertaken by the Federal Trade Commission to iron out bad trade practices in several industries, which have voluntarily taken their troubles to it. But as long as these laws remain as they do, their literal interpretation and enforcement being or not being a matter of policy with whatever administration happens to be in power, they are a menace to cooperative effort to solve these ever pressing economic problems. And unless they are solved in some degree by cooperative effort we shall have bungling attempts to solve them by government interference.

The idea of conducting business upon moral and ethical principles is certainly attractive and as a step in the evolution of business should eventually be tried. Not all at once, perhaps, but by degrees. If business and industry can learn to govern themselves according to the fundamental laws of nature, it probably will be best for all concerned. Business men certainly should have that goal in mind as an ideal, *always;* whether it is to be accomplished in their day and generation or not. Naturally the ideal solution is not going to be found immediately. There will be many cut-and-try, probably unsuccessful, experiments. But, if the fundamentals are ever clearly in mind, a workable solution should be found ultimately.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. com.[37]	12-30-27	3	7	
Allentown P. C. 1st 6's[29]	10-23-28	90	.....	
Alpha P. C. new com.	10-23-28	45	45⅛	75c qu. Oct. 15
Alpha P. C. pfd.[2]	10-22-28	117	.....	
Amer. Aggregate 6's, bonds	10-24-28	106	108	
American Brick Co.	10-22-28	17	17⅞	25c qu. Nov. 1
Am. L. & S. 1st 7's[29]	10-23-28	101	102	
American Silica Corp. 6½'s	10-24-28	96	100	
Arundel Corp. new com.	10-23-28	38	38½	50c qu. Oct. 1
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10]	10-10-28	90	91	
Atlas P. C. com.	10-22-28	39	41	50c qu. Sept. 1
Atlas P. C. pfd.	10-22-28	47	49	66⅔c qu. July 2
Beaver P. C. 1st 7's[20]	10-18-28	97	100	
Bessemer L. & C. Class A[4]	10-19-28	35¾	36	75c qu. Nov. 1
Bessemer L. & C. 1st 6½'s[4]	10-19-28	100¼	101¼	
Bloomington Limestone 6's[29]	10-23-28	95	.....	
Boston S. & G. com.[16]	10-18-28	76	80	$1 qu. July 2
Boston S. & G. 7% pfd.[16]	10-18-28	83	85	1¾% qu. July 2
Boston S. & G. Co. 1st pfd.[16]	10-18-28	93	95	2% qu. July 2
Canada Cem. com.[48]	10-23-28	27	29	
Canada Cement pfd.[48]	10-23-28	.....	98½	1.62½ qu. Sept. 30
Canada Cement 5½'s	10-22-28	100½	102	
Canada Cr. St. Corp. 1st 6½'s	10-22-28	96	99	
Canada Gyp. & Alabastine	10-23-28	73	73½	75c Oct. 1
Certainteed Prod. com.	10-23-28	30½	35	$1 qu. Oct. 1
Certainteed Prod. pfd.	10-23-28	90	94	1.75 qu. Oct. 1
Cleveland Stone new st'k	10-22-28	54	60	50c qu. Sept. 1 & 25c ex.
Columbia S. & G. pfd.	10-23-28	91⅝	92	
Consol. Cement 1st 6½'s, A[42]	10-24-28	94	99	
Consol. Cement 6½ notes[24]	10-24-28	92	96	
Consol. Cement pfd.	10-25-28	40	60	
Consol. S. & G. com. (Canada)	10-23-28	16	.....	
Consol. S. & G. pfd. (Canada)	10-23-28	86¼	.....	
Consumers Rock & Gravel, 1st Mtg. 6's, 1948	10-18-28	98	99½	
Coosa P. C. 1st 6's[29]	10-23-28	45	55	
Coplay Cem. Mfg. 1st 6's[40]	10-22-28	90	.....	
Coplay Cem. Mfg. com.[40]	10-22-28	12½	.....	
Coplay Cem. Mfg. pfd.[40]	10-22-28	72½	.....	
Dewey P. C. 6's[30]	10-24-28	99	.....	
Dolese & Shepard[7]	10-24-28	140	145	$2 qu. Oct. 1; $1 ex. Oct. 1
Edison P. C. com.[19]	10-19-28	25c	.....	
Edison P. C. pfd.[19]	10-19-28	1	.....	
Edison P. C. bonds[19]	10-19-28	75	.....	
Fredonia P. C. 1st 6½'s[32]	12-28-27	97	101	
Giant P. C. com.	10-19-28	25	30	
Giant P. C. pfd.	10-19-28	32	38	3½% June 15
Ideal Cement, new com.	10-23-28	73	75	75c Oct. 1
Ideal Cement 5's, 1943	10-20-28	103	105	
Indiana Limestone 6's	10-23-28	90	90	
International Cem. com.	10-23-28	74¼	74⅞	$1 qu. Sept. 28
International Cem. bonds 5's	10-23-28	98¼	99	Semi-ann. int. payable June 15
Iron City S. & G. bonds 6's[46]	10-18-28	97	98½	
Kelley Is. L. & T. new st'k	10-22-28	53	54	62½c qu. Oct. 1
Ky. Cons. Stone Co. com.[48]	10-19-28	13	14½	
Ky. Cons. St. com. Voting Trust Certif.[48]	10-19-28	13	14½	
Ky. Cons. Stone 6½'s[48]	10-19-28	96½	100	
Ky. Cons. St. Trustee Certif.[48] (1 sh. 7% cum. pfd. & 1 sh. com. stock)	10-19-28	98½	101	$1.75 Aug. 1
Keystone Sand & Sup. 6's[47]	8-22-28	99	100	
Lawrence P. C.[2]	10-22-28	96	101	2% qu. Sept. 29
Lehigh P. C.[2]	10-24-28	47	49	62½c qu. Nov. 1
Lehigh P. C. pfd.[2]	10-24-28	107	109	1¾% qu. Oct. 1
Lyman-Richey 1st 6's, 1932[15]	9-21-28	98	100	
Lyman-Richey 1st 6's, 1935[15]	9-21-28	97½	99½	
Marblehead Lime 1st 7's[34]	10-19-28	100	.....	
Marbleh'd Lime 5½'s, notes[14]	10-19-28	98½	100	
Mich. L. & C. com.[39]	10-20-28	35	.....	
Missouri P. C.	10-23-28	42	43	50c qu. Aug. 1
Monolith Midwest[9]	10-16-28	8	9	
Monolith P. C. com.[9]	10-18-28	14½	15¼	8% ann. Jan. 2
Monolith P. C. pfd.[9]	10-18-28	9	9½	
Monolith P. C. units[9]	10-18-28	32½	34¼	
National Cement 1st 7's[38]	10-20-28	99	101	
National Gypsum A com.[35]	10-23-28	.....	20	
National Gypsum pfd.[35]	10-23-28	.....	60	1¾% qu. Apr. 1
Nazareth Cem. com.	10-20-28	28¾	32	75c qu. Apr. 1
Nazareth Cem. pfd.	10-20-28	100	.....	
Newaygo P. C.[1]	12-30-27	115	.....	
Newaygo P. C. 1st 6½'s[29]	10-23-28	100	.....	
New Eng. Lime pfd., A[41]	10- 6-28	.....	90	
New Eng. Lime pfd., B	10-20-28	97	99	
New Eng. Lime com.	10-20-28	30	32	
New Eng. Lime 1st 6's[14]	10-19-28	96	98	
N. Y. Trap Rock 1st 6's	10-23-28	100⅛	100½	
North Amer. Cem. 1st 6½'s	10-23-28	74	.....	
North Amer. Cem. com.[19]	10-25-28	8	9	
North Amer. Cem. 7% pfd.[19]	10-25-28	25	32	$1.75 qu. Aug. 1
North Amer. Cem. units[19]	10-25-28	33½	38	
North Shore Mat. 1st 5's[15]	10-24-28	98½	.....	
Northwestern States P. C.[37]	10-20-28	195	215	
Pac. Coast Cem. 6's. A	10-18-28	96½	98¾	
Pacific P. C. pfd.	10-19-28	75½	77	1.62½ qu. Apr. 5
Pacific P. C. 6's	10-18-28	98¼	100¾	
Peerless Egyp'n P. C. com.[21]	10-18-28	1¾	2	
Peerless Egyp'n P. C. pfd.[21]	10-18-28	75	80	1¾% qu. July 1
Penn-Dixie Cem. 1st 6's[29]	10-23-28	94¾	.....	
Penn-Dixie Cem. pfd.[28]	10-24-28	84	86	1.75 qu. Sept. 15
Penn-Dixie Cem. com.	10-24-28	16½	17	50c qu. July 1
Penn. Glass Sand Corp. 1st 6's, 1952	10- 3-28	102½	103¼	
Petoskey P. C.	10-23-28	9½	10½	1½% qu.
Riverside P. C. com.	10-19-28	.....	21	
Riverside P. C. 1st pfd.	10-18-28	95	96	1.50 Aug. 1
Riverside P. C., A	10-18-28	18	21	31¼c cum. part. Aug. 1
Riverside P. C., B	10-18-28	1	2	
Rockland-Rockport Lime 1st pfd.[10]	5-17-28	.....	100	3½% s.a. Feb. 1
Rockland-Rockport Lime 2nd pfd.[10]	5-17-28	.....	60	3% s.a. Feb. 1
Rockland-Rockport Lime com.[10]		no market		1½% qu. Nov. 2
Sandusky Cem.	10-22-28	196	230	$2 qu. July 2
Santa Cruz P. C. bonds	10-19-28	105¾	.....	6% annual
Santa Cruz P. C. com.	10-19-28	90	.....	$1 qu. Oct. 1
Schumacher Wallboard com.	10-19-28	17	19	50c May 15
Schumacher Wallboard pfd.	10-19-28	.....	26	
Southwestern P. C. units[44]	10-18-28	270	.....	
Superior P. C., A[20]	10-18-28	48	48½	27½c mo. Aug. 1
Superior P. C., B[20]	10-18-28	35	36	
Trinity P. C. units[37]	10-20-28	154	160	
Trinity P. C. com.[37]	10-20-28	52	.....	
U. S. Gypsum com.	10-24-28	62¼	62¾	2% qu. Sept. 30
U. S. Gypsum, pfd. pt. certif.	10-24-28	38	44	
U. S. Gypsum pfd.	10-24-28	126	.....	1¾% qu. Sept. 30
Universal G. & L. com.[3]	10-24-28	.....	1	
Universal G. & L. pfd.[3]	10-24-28	.....	10	1½% Feb. 15
Universal G. & L., V.T.C.	10-24-28	no market		
Universal G. & L. 1st 6's[3]	10-24-28	.....	60	
Vulcanite P. C. 1st 7½'s[32]	12- 5-27	105	109	
Chas. Warner com.	10-22-28	35	.....	50c qu. Oct. 10 & 25c ex.
Chas. Warner pfd.	10-22-28	109	.....	1¾% qu. Oct. 25
Whitehall Cem. Mfg. com.[36]	10-19-28	150	.....	
Whitehall Cem. Mfg. pfd.[36]	10-19-28	98	.....	
Wisconsin L. & C. 1st 6's[15]	10-24-28	100	.....	
Wolverine P. C. com.	10-23-28	5½	.....	15c qu. Nov. 15
Yosemite P. C., A com.[20]	10-18-28	4¾	5¼	

[1]Quotations by Watling, Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willet, New York. [3]Quotations by Rogers, Tracy Co., Chicago. [4]Quotations by Butler, Beading & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Ralph Schneeloch Co., Portland, Ore. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee Higginson & Co., Boston and Chicago. [11]Nesbit, Thomson & Co., Montreal, Canada. [13]E. B. Merritt & Co., Inc., Bridgeport, Conn. [15]Peters Trust Co., Omaha, Neb. [14]Second Ward Securities Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois, Chicago. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hoit, Rose & Troster, New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., Detroit. [22]Pirnie, Simons and Co., Springfield, Mass. [23]Blair & Co., New York and Chicago. [24]A. B. Leach and Co., Inc., Chicago. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White and Co., New York. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago. [31]McIntyre & Co., New York, N. Y. [32]Hepburn & Co., New York. [33]Boettcher & Co., Denver, Colo. [34]Kidder, Peabody & Co., Boston, Mass. [35]Farnum, Winter and Co., Chicago. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [38]McFetrick and Co., Montreal, Que. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [41]Hornblower & Weeks, New York City and Chicago. [42]E. H. Rollins, Chicago, Ill. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney Williams & Co., Inc., Los Angeles, Calif. [46]Stein Bros. & Boyce, Baltimore, Md. [47] Bank of Pittsburgh, Pittsburgh, Pa. [48]E. W. Hays & Co., Louisville, Ky.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
American Brick Co. pref. (sand-lime brick) 16 sh.[6]	par 25	25¾
Benedict Stone Corp. (cast-stone), 50 pfd., 390 com.[3]	$400 for the lot	.....
Benedict Stone Corp. 1st 7's 1934[9]	.....	86
International Portland Cement Co., Ltd., pfd.	30	45
Knickerbocker Lime Co.[4]	105	.....
River Road Sand and Gravel Co.,[9] 200 shares	$21 per share	

Stock	Price bid	Price asked
Simbroco Stone Co.,[10] 10 sh. pfd., par $50	$10.25 per sh.	
Southern Phosphate Co.[8]	1¼	.....
Vermont Milling Products Co. (slate granules), 22 sh. com. and 12 sh. pfd.[8]	$1 for the lot	.....
Wabash Portland Cement Co.[1]	60	100
Winchester Brick Co., pfd., sand lime brick[5]	10c	.....

[1]Price obtained at auction by Adrian H. Muller & Sons, New York. [3]Price obtained at auction by Weilupp-Bruton and Co., Baltimore, Md. [4]Price obtained at auction by Barnes and Lofland, Philadelphia, on April 4, 1928. [5]Price obtained at auction for lot of 50 shares by R. L. Day and Co., Boston, Mass. [6]Price obtained at auction by Wise, Hobbs and Arnold, Boston, Mass. [8]Auction sales of $1000, Barnes & Lofland, Philadelphia, March 31, 1928. [10]Price at auction, June 6, 1928, R. L. Day & Co., Boston, Mass.

President of Pennsylvania-Dixie Cement Corp. Comments on Cement Imports

IN A LETTER to stockholders of the Pennsylvania-Dixie Cement Corp., President Blaine S. Smith states:

"For the eight months ended August 31 last, profits after depreciation and depletion were $1,420,775, and net income after interest and federal taxes totaled $808,018, which is $190,000 in excess of preferred dividend requirements for the period. This net income is considerably less than the income for the same period in 1927. The reduction is due to the materially lower selling prices obtaining in much of the territory served by the corporation's plants during the first eight months of 1928, caused chiefly by competition of foreign cement which comes into the United States duty free.

"The balance sheet shows current assets of 3¼ times current liabilities and net assets of $4,715,958, with cash in excess of all current liabilities. The good current position has been maintained in spite of the fact that the company has met the sinking fund requirements for the full year 1928 and has acquired a substantial amount of bonds in anticipation of 1929 sinking fund requirements. In addition it has acquired the properties of the Pyramid Portland Cement Co., located at Des Moines, Iowa, for which over $700,000 was paid in cash and the balance in 7% preferred stock.

"We believe that the financial strength of the company and the low operating costs of its properties place it in a sound position, but the disturbed conditions in certain territories may for a time adversely affect its earnings.

"The seriousness of the foreign competition is evidence from the following facts: Belgian cement is made at a wage scale approximately one-quarter of those prevailing for American cement, and production costs conform to standards of living in that country which are far lower than American standards. On this account the American manufacturer is unable to meet this competition profitably. Cement is on the free list of the tariff law and cannot therefore be aided by presidential action.

"The cost of transporting cement from Belgian cement plants to certain American ports on the north Atlantic coast is considerably less than from the principal American producing centers to the same ports. In respect to certain south Atlantic ports, cement can be transported from Belgian plants to these ports for about half the transportation cost from the principal producing centers.

"The effective way to correct these conditions is by the enactment of tariff legislation providing for a duty on cement which will equalize the difference in production and transportation costs in this country and abroad. Both political platforms pledge remedial action and efforts are being made to impress candidates for Congress with the urgent necessity for such tariff relief at the earliest practicable time. The effect of this effort will depend largely upon the number and the interest of those who voice it."

International Cement Corp. Third Quarter Earnings

INTERNATIONAL CEMENT CORP. reports for the quarter ended September 30, 1928, consolidated net income of $1,417,916 after depreciation, expenses, interest and reserve for federal taxes, etc., equal to $2.29 a share on the 618,826 no par common shares outstanding. This compares with $1,128,529 equal after preferred dividends (preferred stock called for redemption May 20, 1928) to $1.55 a share on the common in the preceding quarter and with $1,234,973 or $1.89 a share on the 562,500 common shares outstanding, in the corresponding quarter of 1927.

Consolidated net income for the nine months ended September 30, was $3,614,375 equal after preferred dividends to $5.43 a share on the outstanding common as against $3,283,518 or $4.94 a share on the common shares outstanding in the similar period of 1927.

Consolidated income account for the quarter compares:

INTERNATIONAL CEMENT INCOME ACCOUNT FOR THIRD QUARTER

	1928	1927	1926
Gross sales	$10,209,715	$8,291,489	$8,023,344
Discounts, packages, etc.	2,032,455	1,600,111	1,497,756
Manufacturing costs	4,296,336	3,549,168	3,259,247
Depreciation	616,818	521,481	472,481
Expenditures	1,395,870	1,118,113	1,090,352
Interest	107,643	4,638	.....
Federal taxes, reserves, etc.	342,677	263,005	323,926
Net income	$1,417,916	$1,234,973	$1,379,582

For nine months ended September 30:

	1928	1927	1926
Gross sales	$25,673,285	$22,133,615	$19,728,513
Discounts, etc.	5,002,491	4,244,794	3,621,583
Manufacturing costs	10,655,956	9,549,823	8,020,544
Depreciation	1,608,917	1,315,885	1,190,182
Expenditures	3,687,248	3,063,136	2,912,243
Interest	277,645	5,938	.....
Federal taxes, reserves, etc.	806,655	760,522	799,420
Net income	$3,614,375	$3,283,518	$3,184,540

INTERNATIONAL CEMENT INCOME ACCOUNT FOR FIRST THREE QUARTERS COMPARED

	Third quarter, 1928	Second quarter, 1928	First quarter, 1928
Gross sales	$10,209,715.83	$8,743,632.91	$6,719,938.54
Less: packages, discounts and allowances	2,032,455.59	1,715,970.71	1,274,065.74
Net sales	$ 8,177,260.24	$7,027,662.20	$5,445,872.80
Manufacturing cost excluding depreciation	$ 4,296,335.30	$3,626,636.36	$2,732,982.84
Depreciation	616,818.25	592,050.63	400,048.67
	$ 4,913,153.55	$4,218,686.99	$3,133,031.51
Manufacturing profit	$ 3,264,106.69	$2,808,975.21	$2,312,841.29
Shipping, selling and administrative expenses	1,395,870.05	1,277,619.12	1,013,758.84
Net profit	$ 1,868,236.64	$1,531,356.09	$1,299,082.45
Less: interest charges and financial expenses	107,643.26	153,058.09	16,943.87
	$ 1,760,593.38	$1,378,298.00	$1,282,138.58
Reserves for federal taxes and contingencies	342,676.73	249,768.44	214,209.62
Net to surplus	$ 1,417,916.65	$1,128,529.56	$1,067,928.96

Recent Dividends Announced

American Brick Co. com. (quar.)	25c, Nov. 1
American Brick Co. pfd. (quar.)	50c, Nov. 1
Arundel Corp. com. (quar.)	50c, Oct. 1
British Portland Cement Manufacturers, Ltd. (interim div.)	5%, Sept. 29
Bessemer Limestone and Cement, Class A (quar.)	75c, Nov. 1
Chas. Warner com. (quar.)	50c, Oct. 10
Chas. Warner com. (extra)	25c, Oct. 10
Chas. Warner pfd. (quar.)	$1.75, Oct. 25
Virginia-Carolina Chemical prior pfd. (quar.)	$1.75, Dec. 1
Wolverine Portland Cement com. (quar.)	15c, Nov. 15

Lawrence Cement Earnings for First Eight Months

FOR THE EIGHT MONTHS ended August 31 the Lawrence Portland Cement Co. with mills at Siegfried, Penn., and Thomaston, Maine, reported earnings as follows, compared with the same period in 1927, when the mill at Siegfried only was in operation:

Net earnings before federal taxes	$506,762	$453,887
Earnings per share on $7,500,000 capital stock	$6.75	$6.05

Portland Cement Production in September

Shipments Were 3.2% Above Those of September, 1927—159 Plants Reporting

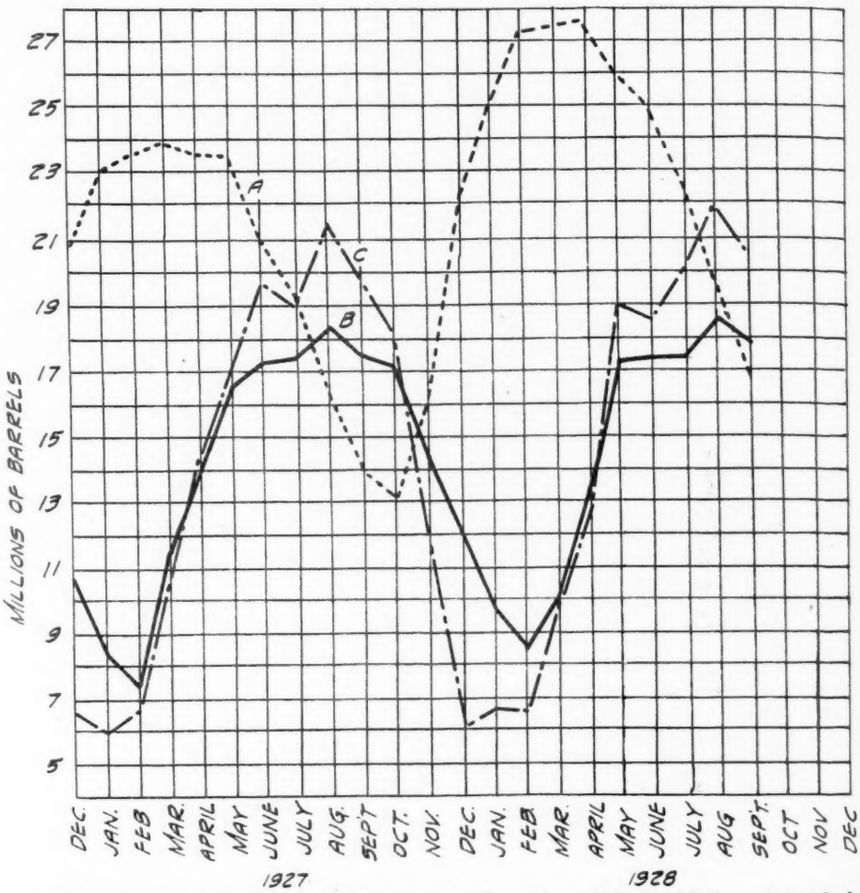
THE PORTLAND CEMENT INDUSTRY in September, 1928, produced 17,856,000 bbl., shipped 20,462,000 bbl. from the mills, and had in stock at the end of the month 16,722,000 bbl., according to the United States Bureau of Mines, Department of Commerce. The production of portland cement in September, 1928, showed an increase of 2% and shipments an increase of 3.2% as compared with September, 1927. Portland cement stocks at the mills were 19.5% higher than a year ago. The total production for the nine months ending September 30, 1928, amounts to 131,036,000 bbl., compared with 128,286,000 bbl. in the same period of 1927, and the total shipments for the nine months ending September 30, 1928, amount to 136,286,000 bbl., compared with 134,998,000 bbl. in the same period of 1927.

The statistics here presented are compiled from reports for September from all manufacturing plants except two for which estimates have been included in lieu of actual returns.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 159 plants at the close of September, 1928, and of 152 plants at the close of September, 1927:

RELATION OF PRODUCTION TO CAPACITY

	Sept. 1928	Sept. 1927	Aug. 1928	July 1928	June 1928
	Pct.	Pct.	Pct.	Pct.	Pct.
The month	91.7	92.3	93.1	87.0	90.1
12 months ended	73.7	72.3	73.5	73.7	73.8



(a) Stocks of finished portland cement at factories; (b) Production of finished portland cement; (c) Shipments of finished portland cement from factories

PRODUCTION AND STOCKS OF CLINKER, BY MONTHS, IN 1927 AND 1928 (IN BARRELS)

Month	1927—Production—1928		Stock end of month 1927	Stock end of month 1928	Month	1927—Production—1928		Stock end of month 1927	Stock end of month 1928
January	10,410,000	11,839,000	9,989,000	9,672,000	July	15,697,000	15,981,000	9,609,000	11,707,000
February	9,253,000	11,363,000	11,943,000	12,237,000	August	16,396,000	16,202,000	7,887,000	*9,357,000
March	12,397,000	12,501,000	12,997,000	14,463,000	September	15,931,000	15,909,000	6,490,000	7,589,000
April	14,246,000	13,844,000	13,335,000	15,002,000	October	16,469,000	.....	5,960,000	.....
May	15,677,000	16,025,000	12,514,000	14,329,000	November	14,698,000	.....	6,374,000	.....
June	15,437,000	15,940,000	10,926,000	12,944,000	December	13,177,000	.....	7,660,000	.....

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN JULY AND AUGUST, 1927 AND 1928, IN BARRELS*

Shipped to	1927—July	1928	1927—August	1928	Shipped to	1927—July	1928	1927—August	1928
Alabama	207,386	267,843	243,841	315,341	New Hampshire	50,796	46,025	56,223	69,903
Alaska	2,029	1,496	338	382	New Jersey	844,190	861,340	853,588	878,977
Arizona	38,125	42,336	34,598	57,033	New Mexico	18,160	36,795	23,750	43,079
Arkansas	72,502	123,490	85,164	150,173	New York	2,467,699	2,480,799	2,749,722	2,774,981
California	1,077,710	1,081,470	1,158,661	1,166,958	North Carolina	321,348	221,912	340,093	218,950
Colorado	113,490	113,414	124,628	147,267	North Dakota	71,813	72,490	69,872	61,931
Connecticut	258,232	266,888	239,392	279,631	Ohio	1,166,296	1,313,568	1,381,581	1,549,784
Delaware	18,765	35,077	40,815	29,447	Oklahoma	287,638	285,643	298,452	286,023
District of Columbia	105,400	87,606	103,217	83,553	Oregon	187,401	140,619	188,586	175,733
Florida	166,647	97,376	180,328	105,108	Pennsylvania	1,573,559	1,437,571	1,706,430	1,699,137
Georgia	179,713	135,770	193,713	181,254	Porto Rico	3,000	.....	3,500	.....
Hawaii	34,500	21,832	28,219	25,413	Rhode Island	69,599	68,980	85,312	71,291
Idaho	28,166	40,823	30,000	45,284	South Carolina	63,414	149,917	103,455	152,387
Illinois	1,962,942	2,321,485	2,066,172	2,581,921	South Dakota	50,896	61,429	50,994	62,440
Indiana	771,651	712,107	868,669	804,868	Tennessee	269,184	288,860	285,835	323,794
Iowa	486,109	873,528	602,653	813,328	Texas	436,475	601,154	533,591	690,901
Kansas	263,430	215,125	251,022	233,127	Utah	41,478	58,462	60,332	65,376
Kentucky	239,555	192,746	283,184	216,674	Vermont	45,365	64,211	67,255	103,293
Louisiana	147,449	113,049	147,709	125,319	Virginia	195,133	183,762	211,679	214,602
Maine	82,034	63,915	81,018	71,721	Washington	299,400	361,159	335,681	408,566
Maryland	272,142	246,605	366,046	260,189	West Virginia	194,693	151,406	239,578	166,289
Massachusetts	290,232	334,822	314,527	308,837	Wisconsin	858,526	812,237	1,035,131	809,545
Michigan	1,360,516	1,540,219	1,788,820	1,707,324	Wyoming	20,374	21,154	22,131	30,976
Minnesota	419,976	435,564	480,599	401,260	Unspecified	29,843	2,209	23,887	30,779
Mississippi	102,252	90,937	111,007	122,486		18,948,355	19,841,130	21,348,350	21,873,450
Missouri	481,281	484,207	560,364	541,927	Foreign countries	35,645	59,870	62,650	96,550
Montana	39,521	58,225	50,776	66,954					
Nebraska	150,181	110,938	180,063	127,833	Total shipped from cement plants	18,984,000	19,901,000	21,411,000	21,970,000
Nevada	10,139	10,535	6,149	14,101					

*Includes estimated distribution of shipments from three plants each month.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN SEPTEMBER, 1927 AND 1928, AND STOCKS IN AUGUST, 1928 (IN BARRELS)

District	Production 1927—Sept.—	1928	Shipments 1927—Sept.—	1928	Stocks at end of month 1927—Sept.—	1928	Stocks at end of August, 1928*
E. Penn., N. J. & Md.	4,058,000	3,601,000	4,596,000	4,141,000	3,494,000	4,984,000	5,524,000
New York and Maine†	1,273,000	1,205,000	1,468,000	1,355,000	1,170,000	1,273,000	1,423,000
Ohio, W'n Penn. and W. Va.	1,804,000	2,267,000	2,352,000	2,559,000	1,735,000	2,155,000	2,447,000
Michigan	1,692,000	1,573,000	1,869,000	1,991,000	1,080,000	879,000	1,297,000
Wis., Ill., Ind. and Ky.	2,472,000	2,401,000	2,564,000	3,085,000	1,139,000	1,283,000	1,967,000
Va., Tenn., Ala, Ga., Fla. and La.	1,471,000	1,433,000	1,490,000	1,475,000	1,126,000	1,634,000	1,676,000
E'n Mo., Ia., Minn. and S. Dak.	1,481,000	1,735,000	2,014,000	2,236,000	1,204,000	1,572,000	2,073,000
W'n Mo., Nebr., Kan. and Okla.	1,033,000	1,201,000	1,187,000	1,270,000	1,314,000	1,153,000	1,222,000
Texas	487,000	544,000	466,000	524,000	272,000	231,000	211,000
Colo., Mont. and Utah..	174,000	321,000	249,000	316,000	384,000	387,000	382,000
California	1,200,000	1,124,000	1,214,000	1,102,000	704,000	768,000	746,000
Ore. and Wash.	360,000	451,000	359,000	408,000	374,000	403,000	360,000
	17,505,000	17,856,000	19,828,000	20,462,000	13,996,000	16,722,000	19,328,000

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1927 AND 1928 (IN BARRELS)

Month	Production 1927	1928	Shipments 1927	1928	Stocks at end of month 1927	1928
January	8,258,000	9,768,000	5,968,000	6,541,000	22,914,000	25,116,000
February	7,377,000	8,797,000	6,731,000	6,563,000	23,563,000	27,349,000
March	11,450,000	10,223,000	11,100,000	10,135,000	23,922,000	27,445,000
April	14,048,000	13,468,000	14,350,000	13,307,000	23,654,000	27,627,000
May	16,701,000	17,280,000	16,865,000	18,986,000	23,503,000	25,984,000
June	17,224,000	17,469,000	19,761,000	18,421,000	20,972,000	25,029,000
July	17,408,000	17,445,000	18,984,000	19,901,000	19,397,000	22,580,000
August	18,315,000	18,730,000	21,411,000	21,970,000	16,292,000	*19,328,000
September	17,505,000	17,856,000	19,828,000	20,462,000	13,996,000	16,722,000
October	17,174,000		18,105,000		13,141,000	
November	14,449,000		11,619,000		16,022,000	
December	11,999,000		6,200,000		22,082,000	
	171,908,000		170,922,000			

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN SEPTEMBER, 1927 AND 1928 (IN BARRELS)

District	1927—Production—1928		Stocks at end of month 1927	1928
Eastern Penn., N. J., and Maryland	3,792,000	3,280,000	772,000	1,296,000
New York and Maine†	1,197,000	1,101,000	283,000	706,000
Ohio, Western Pennsylvania and West Virginia	1,596,000	1,748,000	667,000	791,000
Michigan	1,324,000	1,260,000	628,000	758,000
Wisconsin, Illinois, Indiana and Kentucky	2,125,000	2,073,000	385,000	320,000
Virginia, Tenn., Ala., Ga., Fla., and La.	1,478,000	1,401,000	727,000	826,000
Eastern Missouri, Iowa, Minnesota and S. Dak.	1,375,000	1,519,000	424,000	430,000
Western Missouri, Nebraska, Kansas, Oklahoma	874,000	1,095,000	264,000	398,000
Texas	469,000	557,000	168,000	149,000
Colorado, Montana and Utah	167,000	309,000	487,000	292,000
California	1,215,000	1,201,000	1,348,000	1,273,000
Oregon and Washington	319,000	365,000	337,000	350,000
	15,931,000	15,909,000	6,490,000	7,589,000

*Revised.
†Maine began producing April, 1928, and shipping May, 1928.

Exports and Imports

Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES, AND BY DISTRICTS, IN AUGUST, 1928

Imported from	District into which imported	Barrels	Value
Belgium	Florida	2,000	$ 2,334
	Galveston	11,822	15,199
	Massachusetts	29,834	39,278
	New York	22,500	26,716
	North Carolina	23,770	41,597
	Oregon	3,000	3,794
	Philadelphia	54,597	78,364
	San Antonio	6,000	6,122
	South Carolina	38,115	46,595
	Virginia	600	664
	Washington	3,000	4,308
	Total	195,238	$264,971
Canada	Maine and New Hampshire	8,430	$ 18,313
Denmark	New York	9,042	$ 9,500
	Porto Rico	34,706	48,101
	Total	43,748	$ 57,601
France	New York	500	$ 1,006
Germany	Chicago	13	$ 387
	Los Angeles	1,001	2,454
	New York	224	310
	Total	1,238	$ 3,151
United K'd'm	New York	2,899	$ 4,549
	Philadelphia	7,935	9,267
	Total	10,834	$ 13,816
	Grand total	259,988	$358,858

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN AUGUST, 1928

Exported to	Barrels	Value
Canada	3,801	$ 20,300
Central America	12,700	41,654
Cuba	6,633	19,209
Other West Indies and Bermuda	1,426	5,284
Mexico	5,658	17,490
South America	51,757	156,981
Other countries	6,761	41,948
	88,736	$302,866

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII, AND PORTO RICO, IN AUGUST, 1928

	Barrels	Value
Alaska	1,317	$ 3,984
Hawaii	26,685	64,011
Porto Rico	3,503	8,691
	31,505	$76,686

President of International Cement Protests Imports

PRESIDENT STRUCKMANN of International Cement Corp., in a letter to stockholders asking their aid in securing a tariff on cement, says:

"In recent years there has been brought into seaboard markets of the United States millions of barrels of foreign cement made at wage scales approximately one-fourth those prevailing for American labor. For a time after the beginning of these importations the activities of the foreign interests were confined to a few of the larger markets, but encouraged by success they have extended their activities until they now cover not only the Atlantic coast but the Pacific and Gulf coasts as well.

"In practically all of the territory affected the domestic manufacturer is constantly facing the alternative of either selling its product below cost or surrendering his market to the foreigner. Because of the fact that cement is on the free list of the present tariff act there cannot be any relief through presidential action, neither can the American manufacturer hope to successfully meet, on terms of equality, this competition."

Texas Cement Company Official Speaks Out Against Imports

THE TEXAS PORTLAND CEMENT CO. is up in arms against the importation of foreign cement, as are all other cement producing companies in the United States, according to Lewis R. Ferguson, vice-president of the company.

"Houston also is directly concerned," Mr. Ferguson said, "for the Texas cement plants are losing trade to foreign cement, which comes into this country duty-free. The ironical truth is that Belgium, as well as other European nations, is carrying on its industry through means of loans made by the United States. Instead of helping to rebuild Europe, we are actually helping Europe to break down living conditions in the United States."

Mr. Ferguson says further:

"Congressional action will be needed to meet this situation, and it should not be delayed. A protective duty, sufficiently high to remedy the situation, ought to be put on cement and brick. Not for the benefit of the cement workers exclusively; for, if one is broken down by the unequal competition from Europe, all will suffer. We have been very generous with Europe, but we also owe a little something to the people at home. It is folly to keep Belgian workers employed while American workers are idle."

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1927 AND 1928

Month	1927—Exports— Barrels	Value	1928 Barrels	Value	1927—Imports— Barrels	Value	1928 Barrels	Value
January	75,346	$ 254,072	56,400	$204,875	193,175	$ 269,661	234,753	$342,797
February	71,404	233,985	62,828	221,620	130,421	200,680	164,408	217,525
March	67,956	240,165	74,983	265,719	181,145	261,519	235,930	330,074
April	72,383	243,832	61,676	205,882	192,318	313,262	249,458	324,371
May	59,332	205,574	70,173	236,005	178,929	263,618	190,509	256,872
June	69,205	237,281	59,536	201,313	129,111	201,682	266,537	359,637
July	72,337	249,737	83,759	291,055	175,042	249,665	112,887	151,877
August	61,371	209,198	88,736	302,866	117,605	170,167	259,988	358,858
September	57,890	207,817	.....	.....	233,066	304,796	.....	.....
October	67,639	230,668	.....	.....	221,274	321,777	.....	.....
November	79,764	257,428	.....	.....	141,485	190,419	.....	.....
December	62,099	226,960	.....	.....	156,609	209,205	.....	.....
	816,726	$2,796,717	.....	.....	2,050,180	$2,956,451	.....	.....

Excellent Record System Developed by a Gravel Producer

By Willis Parker
Bartlett Service, Boulder, Colo.

CREDIT LOSSES sustained by the J. W. Brannan Sand and Gravel Co., Denver, Colo., are less than 1/5 of 1% a year, according to F. P. Spratlen, vice-president and treasurer of the company; which, during the past year, supplied approximately 85% of the sand and gravel used for construction purposes in the city of Denver. This excellent record is made possible by several things, among them are an excellent system of ascertaining credit standings, a bookkeeping system that lets no yard of sand escape without an accounting, and a system whereby the prices quoted are verified, so that the customer has no misunderstanding concerning what the material will cost him.

An Adequate Bookkeepng System

Owing to the size of the firm and the enormous amount of sand and gravel it sells, the bookkeeping system is elaborate and detailed, and is facilitated by the use of the most modern of bookkeeping machines. In order to present the system in such a manner as to help other concerns in a like business improve their systems, we shall deal more with the system than with the mechanical appliances used in keeping the records. The plan can be used by any concern, no matter how small, and the records may be maintained by pen and ink instead of adding machines, if the size of the business does not warrant such an expenditure for accounting equipment.

Since credits and accounting work so closely together in this system, we will begin with the placing of the order, which may be over the telephone, by mail, or in person at the company's office.

If the customer is a new one and wants to establish credit, he fills out a form, if he comes in person to the office; or the information is given to the credit department over the phone.

The information sought from the customer is his name, home and business address, and how long those addresses have been maintained, and his former business address; his banking institution, and the names of at least three references, although there is space on the blank for listing a dozen references.

This information obtained, it is turned over to the retail credit bureau for further investigation as to his bank rating, property holding, and the credit standing of the references given.

Customers' Credit Ratings

"We never give credit unless we have three references to consult," says Mr. Sprat-

J. W. BRANNAN SAND AND GRAVEL COMPANY

Date.....

Name .....

Residence Address ..... How long .....

Business Address .....

Former Address ..... How long .....

Rating record since .....

Rating record brought forward to .....

REFERENCE	ACC'T OPENED	HIGH CREDIT	AM'T OWING	DATE	RATING

Bank Account ..... Checking Acc't..... Savings Acc't.....

Bank Rating .....

Property { Yes..... No.....

Remarks .....

The blank which must be filled out and approved for each customer seeking credit, before the material can be delivered on that basis

len, "and the credit bureau must also give us sufficient information of a suitable variety to enable us to pass judgment. Only two persons are permitted to OK the opening of an account, Mr. Brannan or myself."

This system, according to Mr. Spratlen, narrows the responsibility down to one or two men and eliminates embarrassment on the part of employes who are well acquainted with persons seeking to purchase building material.

Credit once established, the rating is placed on a card about 3 by 4 in. and filed in a convenient drawer in the desk occupied by the order clerk and traffic dispatcher. As the orders come to this desk, the order man may consult his file while talking to the customer and ascertain his credit standing right then.

Of course a sand and gravel company has the legal right in Colorado to file a lien against the property in order to force payment of past-due accounts. But this involves so much expense for legal services that it is best to collect the money before liens are necessary, and therefore it is wise to sell to only those who have good credit standings, or on a C.O.D. basis.

When an account becomes overdue, it is referred to Mr. Spratlen immediately, and he loses no time investigating the status of the case and gets busy on the collection.

While they cannot be classed as credit losses, perhaps, there are delays in payments when there is a controversy as to the amounts. Sometimes there must be a compromise. To eliminate such losses the company has an excellent system of verifying orders, obtaining receipt for the deliveries, etc., that serves to facilitate collections.

Two operations take place when an order comes in (providing the credit rating is OK). A price is quoted immediately, so that the customer knows whether or not he is willing to pay that price. If the order is somewhat complex in nature and the order clerk is not positive as to what should be the correct quotation, he refers to Mr. Spratlen, whose desk is adjacent. Mr. Spratlen sets the price and the clerk thus informs the customer. This is done diplomatically that the customer does not realize or recognize any hesitancy.

The price quoted is entered on the quotation slip immediately, and the order is taken on the day book. The quotation slip is in triplicate. The tissue copy stays in the book and the original and duplicate are torn out. They are signed by Mr. Spratlen, and the original is mailed to the customer to confirm the quotation made by telephone. The duplicate is filed alphabetically, and is used in recording the price on the sales slips. Since the slips are numbered, the tissue which remains in the book serves as a numerical and calendar file.

Franklin 17
Phones Franklin 18
Franklin 19

Q No. 2197

J. W. Brannan Sand & Gravel Company

4800 Gilpin St. *LIGHTNING SERVICE* Denver, Colo.

_____ _____ 192

We confirm our quotation on the following materials to be delivered to you at

FROM PIT NO.	1	2	3	4	5	6	7	8
Screened Sand Per Yd.								
Screened Gravel Per Yd.								
Pit Run Gravel Per Yd.								
Fine Sand Per Yd.								
Pea Gravel Per Yd.								
Haul Per Yd.								

Prices are quoted on materials which we are in a position to furnish.
We do not guarantee our materials to conform to any specifications.

J. W. BRANNAN SAND & GRAVEL CO.

By_____

The quotation slip which is filled out in triplicate, one going to the customers and two being retained by the company

Filling Orders

Having taken the order, the clerk phones the pit from which the material is to be taken. There are nine pits. Each pit has a "Whiz" order machine on which is indicated the pit number as well as the number of the order. At the pit, the plant foreman makes out the sales slip, which is in quadruplicate. The original is signed by the customer and returned to the office. The duplicate is left with the customer. The third copy is used

ORDER { Franklin 18
PHONES { Franklin 19

J. W. BRANNAN
LIGHTNING SERVICE
SAND AND GRAVEL CO.
4800 GILPIN STREET
(Stockyards)

Denver, Colo., ...192.....

Sold to.....

Address.....

Delivered by.....

.....yards Screened Sand

.....yards Screened Gravel

.....yards Pit Run Gravel

.....yards Fine Sand

.....yards Pea Gravel

Received by.....

The sales slip is made out in quadruplicate, one copy of which the customer keeps, while the others are placed in the company's files

for posting and is filed alphabetically by days. The fourth copy is filed in the numerical file. Thus it is almost impossible to lose all of the copies of the order; at least one of the three can be produced to verify the fact that the order was delivered.

In posting, each job is kept separate. That is, if a contractor has several jobs on the go, the materials delivered to each job are listed separately, under his name, with the address of the job. This is made out in triplicate, by means of the posting or bookkeeping machine used. The originals are collected at the end of the month, and the monthly statement to that contractor is made out, and the original, together with the originals for each job, are mailed to him.

In this manner he is able to check each job, compare the sales tickets with the company's statements, and know exactly where he stands in regard to each and every yard of sand or gravel purchased. The company has the receipted sales slips to prove that the material was received on the job. The bookkeeping machinery carries the totals right through, and there is a third copy or sheet that lists all of the statements by name and amounts; and, when the complete total is taken, the company can tell immediately just how much material in dollars and cents has been sold during the month. Record is also made on this sheet of past-due accounts, so that the totals also show how much is outstanding from the previous months.

Plant Records of Shipments

The material taken from the gravel pits is recorded by pit and by the commodity taken out of each pit. That is, the various kinds of sand and gravel are kept in a separate total by the individual pit and by all pits. Also, the earnings in dollars and cents of each pit is maintained daily and monthly, and the grand total is carried along of all pits. At the end of the month these figures are transferred to the yearly record.

So detailed and complete are the records that it makes no difference what day you may desire to ascertain the amount of business done thus far during the month, it is possible to turn to the books and get the figures in as much detail as you may desire.

Drivers' Receipts

In the filing of the originals of the order slips, care is taken to file them under the name of the driver, and his slips are segregated by pits, for all drivers work out of all pits, as a general thing, every month. This is for the purpose of computing his earnings by the yard-mile, and is a handy reference when a controversy arises concerning any one delivery. By referring to the company's sales record for the job, the bookkeeper may ascertain which drives handled the delivery and pull out the slip showing the signature, and call in the driver to verify it, if necessary.

The sales slip handed by the driver to the foreman on the job for receipting does not carry the price of the commodity—merely the kind of material and the quantity. The price has been computed in the office from the quotation slip made out at the time the order is taken. The exception to the rule, of course, is when it is a C.O.D. order.

Corresponding to the "day order book," on which the orders are listed at the main office as they come in, and before they are telephoned to the pit, each pit foreman has a day book on which he enters the orders when phoned to him and before he makes out the delivery ticket. This enables the pit foremen to keep some record of his work for himself. On this book he lists the time each order was given to him, and when the truck left the pit with it. Also a notation is made as to when the delivery is desired, as passed along to him by the order clerk and traffic manager. He also notes the name of the driver handling that delivery.

So complete is the system that not one yard of sand or gravel is unaccounted for.

It may seem that the system is too complicated for a small company. Yet the failure to keep accurate records is one of the reasons for so many sand and gravel companies failing in the business. Mr. Spratlen and Miss I. W. Drennen, who has charge of the accounting system, declare that detailed accounts are possible without the use of expensive bookkeeping machinery, if the size of the business does not warrant the expenditure, but that such a system will enable the gravel pit owner to stop many losses that otherwise might bankrupt him.

Los Angeles Rock Products War Continues

CHARGES that the members of the Southern California Rock Products Association have entered into an unlawful agreement to control the sale and distribution of rock, sand and gravel in Los Angeles, Calif., are made in a suit filed recently in superior court against the association by the Blue Diamond Co., dealers and producers of building materials.

Individual members of the association named defendants in the suit are the Reliance Rock Co., Consumers Rock and Gravel Co., Union Rock Co., Rancho Rock Co., Builders Crushed Rock Co., Graham Bros., Inc., Sunset Rock Co., and California Materials, Inc. The complaint asks $50,000 damages from the defendants and a court order restraining the association and its members from carrying out the asserted unlawful agreement.

According to the complaint, the defendants control 75% of the rock, sand and gravel production in Los Angeles and it is necessary for the plaintiff to purchase large amounts of its materials from members of the association.

The plaintiff corporation states it has at all times refused to become a party to the asserted agreement, which, it charges, is in restraint o ftrade.

The complaint charges the defendants have classified the plaintiff as a "dealer," and as such, under the policy of the association, is not entitled to sell rock, sand and gravel for street work or Class A buildings under construction in Los Angeles.

In line with the asserted agreement, the defendants are charged with having placed a boycott on the plaintiff, which consists of refusal by members of the association to sell rock, sand or gravel to the plaintiff.—*Los Angeles* (Calif.) *Times.*

Mission, Texas, Gravel Plants Are Busy

MISSION, TEX., has one big industry that seldom gets in the headlines, but which, nevertheless, accounts for an overwhelming amount of freight shipments through the local yards. That is the gravel pits west of the city. No less than a dozen companies are operating over an area a few miles square.

Although the heavy rains in September curtailed the output of the pits, upward of 2000 cars of gravel were shipped through the Mission yards, besides hundreds of truck loads taken out. The pits provide some of the best gravel in existence and have a capacity of considerably over 100 cars a day. Shipments during September exceeded 1,700 cars, while during August they went above 2,000 cars.

The pits are the biggest in south Texas and are the only ones in the valley. Hidalgo county has been at an advantage in constructing its roads with gravel at its door. Several progressive gravel companies maintain their offices in Mission, including the La Joya Gravel Co., Havana Gravel Co., Abney Gravel Co., Singer Gravel Co., Gulf Gravel Co.—*Mission* (Tex.) *Times.*

Solvay Process Company Said To Be Planning Quarry at Chaumont, N. Y.

REPORT that the Solvay Process Co., Syracuse, N. Y., is negotiating for the purchase of large additional tracts of limestone deposits at Chaumont, 14 miles northwest of Watertown, has led to the belief that the company intends to establish a quarry and crushing plant there.

The Solvay Process Co. already owns about 1,000 acres of land holding deposits of limestone, but since the purchase several years ago never made an attempt to use it. Farmers of the vicinity occupy the land on leases.

The deposits now sought are owned by the Adams-Duford Co. of Chaumont. It is probable the Solvay company will buy the Adams-Duford quarry equipment. The latter firm has a daily output of about 500 tons of crushed stone and 100 tons of ground limestone.—*Syracuse* (N. Y.) *Herald.*

Accidents Still on the Run

Cement Plants Continue Improvement for First 9 Months of 1928 Over 1927 Figures

THE nine month accident totals just compiled by the Portland Cement Association show a reduction of 25% below the record of the corresponding period last year. During the first nine months of 1928 there were 791 lost time accidents as against 1054 lost time accidents in nine months of 1927. Whereas the average monthly accident rate for 1927 was 114, it has been reduced to 88 for the three quarters of 1928 already elapsed. Although September is usually considered a hazardous month, September, 1928, had only 82 accidents, several less than the average for the months elapsed so far.

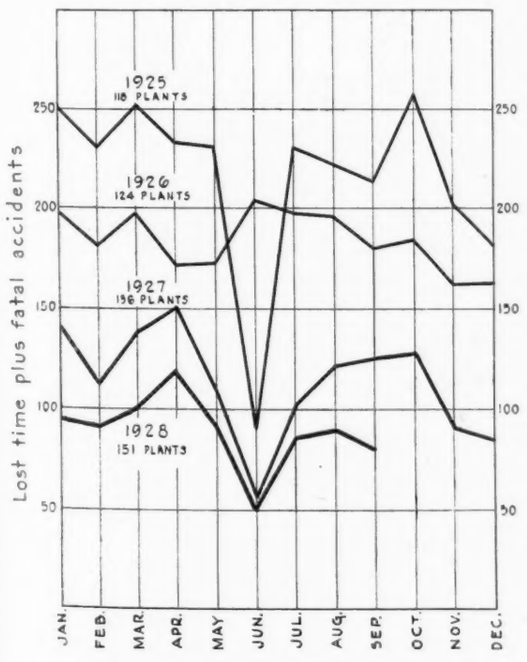
The shrinking monthly accident rate, in contrast with the increasing number of plants, is shown by the following table:

Year	Number of plants	Avg. number of lost-time accidents per month
1924	100	261
1925	118	217
1926	124	185
1927	136	114
1928*	150	88

*Rate based on 9-month total.

Every month since June, 1926, shows a lower number of accidents than corresponding months of previous years, the extent of current gains being particularly noticeable from the monthly accident frequency diagram extended to show September.

At the end of September, 28 mills retained perfect safety records since January 1, and 27 were then qualified as prospective winners of the Portland Cement Association trophy. One mill which ran without accident is ineligible to win the trophy because its operations will have aggregated less than six months out of the present calendar year.



Complete chart of accidents in cement plants, by months, from January, 1925, to September, 1928

Olympic Portland Cement Plant Doubles Output for 1927-28

IN 14 YEARS of continuous operation, the Bellingham plant of the Olympic Portland Cement Co. enjoyed in the last two years its greatest output and market, according to General Manager A. F. Krabbe, and the coming year promises even greater results with the first perfected production of "Velo," the new quick-hardening cement, in major quantity to supply the demands of the Western and Pacific Coast states and the foreign market.

The local plant has been experimenting with and perfecting Velo during the last two years, and is now ready to produce in quantity with the company's assurance of perfection in quality.

The present daily capacity of the plant is 3,000 bbl. of portland cement. There are three kilns and when in full operation the plant requires a trainload of 15 to 20 car loads of lime rock per day, brought over the Milwaukee railway from the company's quarry at Balfour, between Kendall and Sumas, 30 miles from Bellingham.

The company mines its clay near Brennan, a station on the Great Northern railway five miles north of the city. Rock storage for 20,000 tons is maintained at the plant, and there is also special space for 10,000 tons of clay.

Contruction of the mill was begun in 1912, and operation began in May, 1913, the corporation being a stock company with $1,500,000 capital. During the earlier years the plant was operated at about 40% full capacity, but the demand for the output has maintained operation during the last two years at 80% of full capacity. There is cement storage equipment at the plant for 100,000 tons of cement and 150,000 tons of clinker.

The Olympic Portland Cement Co. employs 175 men, including 125 in the mill itself and 40 at the lime quarry at Balfour. Up to this time two cements mills in western Washington, the Bellingham plant and the one at Concrete in Skagit county, were able to supply the Pacific Northwest market. Within the last year, however, two more cement mills have been established in this region to compete for available domestic and foreign business.

The Bellingham company is well prepared to meet this situation, not only in the commercial production of Velo quick-hardening cement the coming year, but in improved handling of its abundant raw material.

A splendid new crushing plant is being established at the site of the lime quarries at Balfour. The lime quarry itself, at the base of Red Mountain, is being abandoned and the new electric shovel, which handles 3 cu. yd. of limerock in one shovelful, has been moved on its own power to a new quarry location 1,200 ft. above, near the crest of Red Mountain, making its own switchback road, between 20 and 30 ft. in width, on its way up to the new quarry location.

The crushing plant is situated at the base of the mountain near the old quarry and on level ground. The rock will be conveyed to the crusher by means of an aerial tramway directly to the giant crusher from the quarry 1,200 ft. sheer altitude above.—*Bellingham* (Wash.) *American.*

Belleville (Ont.) Plant Is Undaunted by Mishap

AFTER one of the longest accident-free periods in the history of the cement industry, consisting of 644 consecutive days, an unfortunate accident occurred on October 2, at the Belleville (Ontario) plant of the Canada Cement Co. The Belleville organization, which had been working diligently to complete two years without a personal injury mishap, had the following unusual department records to its credit on October 15:

DAYS GONE WITHOUT A LOST-TIME ACCIDENT, TO OCTOBER 15, 1928

Department	Days Gone
Kiln room	2845
Clay dryers	2132
Coal mill	2123
Raw mill	1923
Rock dryers	1866
Repair gang	1844
Clinker mill	1733
Bag department	1725
Electrical	1608
Track gang	1559
T. R. R.	1092
Office and store	1041
Clay pit	1033
Machine shop	922
Yard	883
Carpenters	814
Ballast plant	693
Packing	689
Quarry	15

According to J. H. Legate, plant superintendent, the disappointment of the men as a result of the accident which marred their excellent record will in no wise discourage them. The safety committee immediately organized a new drive for a record that will surpass past results. Building upon the excellent history of the past few years, this mill organization feels confident of succeeding.

Sand-Lime Brick Production and Shipments in September

THE following data are compiled from reports received direct from 26 producers of sand-lime brick located in various parts of the United States and Canada. The number of plants reporting is one less than those furnishing statistics for the August estimate published in the September 15 issue. The statistics below may be regarded as representative of the entire industry, the reporting plants having about one-half the production capacity in the United States and Canada.

As the building season draws to a close, the effect on the sand-lime brick industry is noticed in the decreased production figures shown for September compared to those for August. For the past month, five plants reported no production as against four plants in August. Both rail and truck shipments show a sharp decline, while on the other hand there is a noticeable increase of stocks on hand, indicating that the companies are preparing for a winter closed period. The unfilled orders remain at about the same figure as given in August. There are no changes of note in the prices listed for September.

The following are average prices quoted for sand-lime brick in September:

Average Prices for September

Shipping Point	Plant Price	Delivered
Albany, Ga.	$10.00@11.00	$11.50@12.50
Atlantic City, N. J.	12.00	.....
Buffalo, N. Y.	12.25	16.75
Dayton, Ohio	12.50	15.50
Detroit, Mich.	.....	16.00
Detroit, Mich. (less 5%)	.....	15.50@16.00
Detroit, Mich.	13.00	15.50
Detroit, Mich.	13.00	15.50@16.00
Flint, Mich. (less 5%)	.....	18.00
Grand Rapids, Mich.	12.50	.....
Hartford, Conn.	14.00	19.00
Jackson, Mich.	12.25	.....
Madison, Wis.	12.50	14.00
Menominee, Mich.	11.00	14.50
Milwaukee, Wis.	10.50	13.00
Minneapolis, Minn.	10.00	12.75
Mishawaka, Ind.	11.00	.....
Pontiac, Mich.	12.00	14.00
Rochester, N. Y.	.....	19.75
Saginaw, Mich.	12.00	.....
Sebewaing, Mich.	.....	.....
Syracuse, N. Y.	.....	.....
Toronto, Canada	12.50	15.00
West Toronto, Canada	.....	15.00
Winchester, Mass.	.....	16.00

The following statistics are compiled from data received direct from 26 producers of sand-lime brick in the United States and Canada:

Statistics for August and September, 1928

	*August	†September
Production	21,680,100	17,266,500
Shipments (rail)	8,284,400	6,767,300
Shipments (truck)	13,214,500	11,281,400
Stocks	14,445,800	15,304,100
Unfilled orders	14,455,000	14,455,000

*27 plants reporting.

†Incomplete, seven plants not reporting unfilled orders.

Notes from Producers

The Sand-Lime Brick Association has announced that the 25th annual meeting of the association will be held at the Mayflower hotel in Washington, D. C., on February 5, 6 and 7, 1929. As this is the quarter century meeting, a special effort is being made by the association and by John L. Jackson, the president, to make it the best and most interesting gathering yet held.

The Walker and Frank Brick Co., Detroit, Mich., are supplying 200,000 brick for the new A. & P. warehouse in Detroit, the contractors for which are the Austin company. The company also furnished 125,000 brick for a store building owned by John Corsi of Detroit and constructed of sand-lime brick.

The Jackson Brick Co., Jackson, Mich., have orders to supply brick for additions to the Otsego hotel and to the Mercy hospital, both of which are in Jackson. Another recent order is for bricks for a new store building in Jackson.

Paragon Plaster Co., Syracuse, N. Y., are furnishing brick for two municipal jobs in Syracuse. One is the new pumping station of the City Bureau of Water and the other is the city incinerator for the Department of Public Works. Randall and Vedder are the architects for both projects, and Wm. F. Sheridan is the contractor for the former, while Hueber Bros. are building the latter.

Southern Lime Products Co. Plant in Georgia Nearing Completion

THE SOUTHERN LIME PRODUCTS CO., a corporation owned by S. J. Groves and Sons Co., nationally known contractors, is rapidly completing its lime rock quarry on Flint river, just five miles north of Crisp county's hydro-electric development, near Cordele, Ga. This development is one of Crisp county's newest industries and when South Georgia begins paving her county and state roads it has possibilities of becoming one of the county's big industries.

The crushing plant of this company is modern in every respect, being 100% electrically equipped and officials state that it will have a capacity of 50 to 60 carloads of crushed lime rock per day, employing 40 to 50 men in the operation. The railroad facilities of Cordele and Albany make it possible for shipments to reach any point in South Georgia within 24 hours.

The officers of the company follow: C. H. Groves, president; C. D. Walter, vice-president; W. K. Snellgrove, local manager; and Clay M. Snyder engineer and sales manager. All of these men are road builders with engineering and contracting experience covering a period of many years. Each of them through actual construction and close observation of the hundreds of miles of lime rock pavement laid in Florida, feel that the future of lime rock roads in Georgia is assured.—*Tifton* (Ga.) *Gazette.*

New Kentucky Cement Mill Will Be Near Frankfort

KENTUCKY'S latest industrial plant, a $2,500,000 cement plant, for which more than 50 cities and communities in the state have been bidding, will be located near Frankfort, on the Baker distillery property at the forks of Elkhorn, it was announced October 10 by C. Frank Dunn, secretary of the Kentucky Progress Commission.

The decision ends more than seven months investigation by experts of the Kentucky Cement Corp., which was induced to decide upon a Kentucky plant by state officials headed by Governor Sampson and the progress commission.

The announcement said that the corporation has exercised options turned over to them by the Frankfort Chamber of Commerce and that actual construction work will begin within the next 30 days, depending upon the time necessary to let the contract. Main offices will be established at Frankfort, with offices throughout the state.

F. B. Drew of McAlester, Okla., is president of the corporation, which has a capital of $2,500,000, all stock subscribed. The Hunt Engineering Co. of Kansas City Mo., has been retained by the company to do the engineering work in connection with the establishment of the new plant, and officers already are in New York looking after machinery equipment. W. D. McCammish is secretary of the new corporation, and he has already opened offices in Frankfort.

The plant will have an annual output of 1,400,000 bbl. of new "super cement" and will be so built to use a new "semi-dry" manufacturing process. Under terms of a contract with the commonwealth of Kentucky, announced several months ago, all material and labor used in the plant are to be from Kentucky. The annual payroll will be approximately $500,000 and the state will be further benefited by the use of about 200,000 tons of Kentucky coal annually.

Central location as to rail and market facilities was one of the reasons for the selection of Frankfort, Mr. Drew stated in announcing the decision of the corporation to come here.

"Chemists have spent months testing the various formations and over 200 laboratory tests have been made," he said.

"Numerous test holes were drilled and the chemists concluded that the materials as found in Franklin county are specially well suited for the manufacture of cement.

"It is to be regretted that the mill could not be located at the many points that asked for it," Mr. Drew said. "The citizens of the state who made application for the mill have been very fair and have shown the right spirit when they started that in case they were not successful in bringing the mill to their localities they would be entirely satisfied wherever it happened to go, so long as it was in Kentucky."—*Louisville* (Ky.) *Herald-Post.*

The Fort Garry Hotel, in Winnipeg, Canada, which is entirely faced with sand-lime brick

Sand-Lime Brick in Fine Buildings

THE use of sand-lime brick in the biggest and finest buildings now being erected is becoming more and more common all of the time. The accompanying illustration shows the new Fort Garry Hotel in Winnipeg, Canada, which is the largest and finest hotel in that part of the Dominion. This building was entirely faced with sand-lime brick. The hotel is of striking appearance and prominently placed in the city. It is operated by the Canadian National Railways.

Another recently completed building in which sand-lime brick was used, is the Mather Tower in Chicago fronting on Wacker Drive, the city's great new river front business boulevard. This street is destined to become one of the most impressive thoroughfares in the world, and such buildings as the Mather Tower are fast bringing it to this position. Sand-lime brick were used exclusively on the side and rear walls of this building which is the tallest in Chicago. The brick were furnished by the Northern Indiana Brick Co., of Mishawaka, Ind. Herbert H. Riddle of Chicago was the architect and R. T. Wilson & Co., of Chicago were the mason contractors. Similar examples of the use of sand lime brick have been noted in almost every large city.

Okay, Arkansas—a New Cement Town

THE NEW TOWN to be built where the Arkansas Portland Cement Co. is building its plant near Saratoga, Ark., has been named Okay, and application has been made for a postoffice by that name. Schall, where the spur road to the plant will leave the G., N. & A., will be known as Okay Junction. Material is being placed on the ground for the new road.

The L. E. Meyers Construction Co. has a large force of men working out of Ashdown and Mineral Springs on the electric power line.—*Idabel* (Ark.) *Gazette.*

Foreign Abstracts and Patent Review

Steam-Hardening Tests for Obtaining 28-Day Strengths in Two Days. Dr. Karl Biehl, head of the Wicking Institute for Cement and Concrete Research, Lengerich, i. W., states that in the 80's and 90's the high-pressure steam test was recommended by Michaelis, Erdmenger and others in search for a rapid and reliable method of testing consistency in volume of cement samples. These researchers realized the feasibility of the steam pressure test for other cement testing purposes and in 1880 Michaelis mentioned that under a 24-hour exposure to steam of 140 to 180 deg. C. and 4 to 10 atmospheres (284 to 356 deg. F. and 59 to 147 lb. per sq. in. pressure) the entire hardening process of cement samples could be completed within the shortest period. In 1881 Erdmenger pointed to the hardening effect of the steam pressure test and in 1891 he pointed out that besides the determination of the consistency in volume the high pressure steam test has the advantage of determining the active magnesia and of determining quickly the quality of the cement; he occupied himself with the problem until 1896. The literature regarding the steam-hardening process for cement testing is limited, there being only two German reports of the year 1909, and a recent American report available. A number of experiments on 24-hour steam hardening were found described in some old journals dating from the years 1906 to 1910. But the compression strength obtained with the steam pressure treatment always exceeded considerably the standard compression strength obtained in the 28-day water, and water and air stored samples, so that no certain relations can be established between the strengths obtained in the standard 28-day and the 24-hour steam-hardening tests. However, the cements produced today show a more rapid and intensive hardening under the standard 28-day test. Dr. Karl Biehl procured a gas-fired Pflugbeil steam-generating tank of 52-quart capacity and provided with a safety valve and two manometers, one of them being a control meter and the other one a gas-pressure regulator which permitted adjustment to and maintenance of any desired steam pressure to 735 lb. per sq. in. The tank is filled one-fourth with water, and above the water is a perforated sheet plate resting on tripod, upon which the test samples of cement are placed about 24 hours after they are prepared, so that they can be flushed with steam at all sides; in each test six samples of cement were tested for tensile strength and three for compressive strength and the averages entered in the table. The tests for strength were made immediately upon removal of the samples from the tank. All cements tested stood up in the boiling test and in the standard test, and also in the steam pressure test in respect to consistency in volume. First of all the most favorable length of time of exposure and then the most favorable pressure for the selected time of exposure for the steam hardening had to be determined to assure usable results with the test samples of cement. The 8 to 10 at. (118 to 147 lb.) steam-hardening pressure employed in making sand-lime brick was adapted as apparently being desirable. The results in Table I *a* show that the strengths obtained in steam hardening are dependent upon the strength of exposure to high pressure steam. In this case the most favorable time was 16 hours; as had also been found by Erdmenger, the strengths decrease if exposure is prolonged. The results in Table I *b*, secured with identical test samples, exposed for two hours, indicate that the strengths of the cement samples depend also upon the steam pressure and with it upon the steam temperature, the most favorable pressure being at 16 at. (235 lb.). Table I *c* shows the results of exposure for four hours at different pressures, the best results being 16 and 20 at. (294 and 353 lb.) pressure. In obtaining the results in Table I *d*, the same pressures as for Table I *c* were used, but the exposure prolonged to eight hours to obtain strength values about equal to those obtained in the standard 28-day test method at the head of Table I. Then Dr. Karl Biehl tested 12 different cements at 16 at. (235 lb.) pressure for eight hours each, and the results are given in Table II. Unfortunately the tensile strengths were not obtained, except for sample No. 12, but to get them the test is to be repeated. The figures are arranged according to the increasing figures for compression strength in the standard 28-day test. The results in the steam-hardening test tally quite well with those of the standard 28-day test, so that a steam-hardening test of eight hours of exposure and at 235 lb. pressure per sq. in. appears most desirable to cut the 28-day test period down to two days. Whether the exceptions in Table II are due the cements, or whether the most favorable requirements in time and pressure for the different cements are still varying, will be determined in later tests.—*Zement* (1928), **17**, 16, pp. 654-657.

TABLE I. RESULTS OF TESTING STANDARD PORTLAND CEMENT BY STANDARD 28-DAY METHOD, AND BY STEAM-HARDENING METHOD FOR DIFFERENT LENGTHS OF TIME AND AT DIFFERENT PRESSURES AND TEMPERATURES

Test	Sample No.	Time; or Pressure and Temperature	Compressive Strength kg.	Tensile Strength kg.
Standard	1	Water deposit	618.0	35.1
28-day	2	Combined deposit	691.3	44.1
		TABLE I *a*		
8 at. (118 lb.)	3	2 hours	449.5	28.9
pressure,	4	4 hours	539.5	37.8
170 deg. C.	5	8 hours	558.0	48.9
(338 deg. F.);	6	12 hours	652.0	51.6
different	7	16 hours	669.0	47.9
periods	8	20 hours	643.5	50.8
	9	24 hours	644.0	48.2
		TABLE I *b*		
	3	4 at. (59 lb.); 143 deg. C. (289 deg. F.)	340.0	20.9
2 hours;	4	8 at. (118 lb.); 160 deg. C. (336 deg. F.)	449.5	28.9
different	5	12 at. (176 lb.); 187 deg. C. (368 deg. F.)	499.0	37.5
pressures and	6	16 at. (235 lb.); 200 deg. C. (392 deg. F.)	553.0	41.4
temperatures	7	20 at. (294 lb.); 211 deg. C. (412 deg. F.)	531.5	36.4
	8	24 at. (353 lb.); 221 deg. C. (430 deg. F.)	527.5	29.8
		TABLE I *c*		
4 hours;	3	12 at. (176 lb.); 187 deg. C. (368 deg. F.)	489.0	22.8
different	4	16 at. (235 lb.); 200 deg. C. (392 deg. F.)	634.5	38.6
pressures and	5	20 at. (294 lb.); 211 deg. C. (412 deg. F.)	639.5	40.0
temperatures	6	24 at. (353 lb.); 221 deg. C. (430 deg. F.)	603.0	34.5
		TABLE I *d*		
2 hours;	3		664.0	40.5
different	4	Pressures and temperatures as	699.0	40.8
pressures and	5	in Test I *c* above	671.0	50.5
temperatures	6		636.5	47.2

TABLE II. RESULTS OF STEAM-HARDENING 12 DIFFERENT CEMENTS WITH STEAM OF 16 AT. (235 LB.) PRESSURE AND 200 DEG. C. (392 DEG. F.) TEMPERATURES FOR EIGHT HOURS

Sample No.	Standard 28-Day Test Combined Deposit Compressive Strength kg.	Standard 28-Day Test Combined Deposit Tensile Strength kg.	Steam-Hardening Test Compressive Strength kg.	Steam-Hardening Test Tensile Strength kg.	Kind of Cement
1	40.0	425	.....	456	portland cement
2	44.3	437	.....	497	portland cement
3	43.4	442	.....	448	blast-furnace cement
4	39.8	508	.....	502	iron-portland cement
5	46.6	516	.....	525	portland cement
6	36.6	530	.....	463	portland cement
7	41.7	535	.....	521	portland cement
8	46.8	540	.....	506	portland cement
9	42.7	544	.....	581	portland cement
10	40.0	549	.....	519	portland cement
11	52.6	654	.....	610	high-grade portland cement
12	44.8	656	45.6	592	high-grade portland cement

Dangers of Gypsum in Concrete Structures. Sulphuric acid present in concrete combines with aluminate of lime to form gypsum (sulphate of lime), and eventually a double salt, the double sulphate of alumina and lime, a combination of the alum order which absorbs water energetically and as a result causes expansion, fissuring and scaling of the concrete. The danger of sulphuric acid in concrete is greater in calcareous and alumina cements, so that blast-furnace cement or iron cement, low in alumina content, and especially ciment fondu are preferable, whereas portland cement is rendered resistive by adding trass. The sulphuric acid is likely to enter the concrete in preparing mortar with sulphur-containing water obtained from certain strata in the soil or certain manufacturing districts, or with sulphur-containing sand or gravel as well as by way of unprotected concrete surfaces.—*Le Ciment* (1928), **33**, 5, pp. 203-4.

Tests on Materials for Road Construction. Engineer Ragnar Schlyter presents the results of tests on samples of granite, diorite, limestone, quartz, sandstone, gneiss, diabase and other stones for road construction purposes in tables and diagrams as a sequel to the description of the equipment of the laboratory for road construction materials at the materials testing bureau of the Swedish government in No. 73, 1927, and an international bibliography is appended.—*Tonindustrie-Zeitung* (1928), **52**, 55, pp. 1119-1121, and 56, pp. 1139-1141.

Grain Composition of German Gravel-Sand. The grain composition of gravel-sand may be improved upon in two technical ways; firstly, the gravel-sands can be separated into their various grain sizes and then again added in the desired proportions; and secondly, favorable composition may be obtained just as well by adding round stone to which trass belongs, or by adding pebbles or stone-chips.—*Baumarkt* (1928), 29, p. 973.

Mineral Paints. Silicate or mineral paints consist of a color base or binder simulating plaster or other finish in their composition and of specially selected dry colors, this mixture entering into the smallest ducts of the plaster or other finish on the facades of buildings, coloring it inside and outside and securing a surface impermeable to water and assuring longer life by effecting an intimate chemical combination. — *Baumarkt* (1928), 27, p. 905.

Survey of the Literature on the Constitution of Portland Cement Clinker. In following up the articles in Nos. 22, 29, 30, 32, 39, 41, 42, H. Richarz supplements with a summary of the recent literature on the above subject.—*Tonindustrie-Zeitung* (1928), **52**, 53, pp. 1078-81.

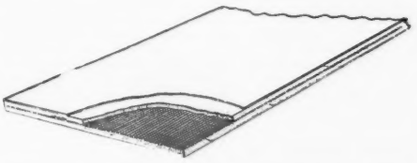
Comparative Observations Upon the Start of the Setting Period by the Use of the Vicat Needle and the Setting Automat. Dr. Nitzsche describes the method and the results of comparative tests upon four different cements. An increase in temperature accelerates the start of the setting and a covering of the vessels containing the test samples retards the start of the setting due to a decrease in evaporation. The test results are presented in tables.—*Tonindustrie-Zeitung* (1928), **52**, 51, pp. 1036-7.

Manufacture of Artificial Stone. Porous artificial stone is made by forming a gel from an inorganic or organic material, for example, starch, by boiling or chemical treatment in a limited quantity of water, stirring the gel into a larger quantity of water, and adding hydraulic binding media, such as gypsum.—*British Patent No.* 285,470.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Reinforced Plaster Board. This is a plaster board having a wire fabric embedded in the matrix, in which, when it is nailed to the wall or studding, as would be the case in ordinary construction, the meshed filler



A wire cloth embedded in plaster board

acts as a stop or obstruction for the nail head and thus leaves a recess in the board at that point. This recess acts as a dowel for the succeeding layer of applied plaster. *C. O. Walker, assignor to Standard Plastering System, Inc., U. S. Patent No.* 1,685,254.

Stabilizing Compound for Plaster. The patent describes a method of securing uniform setting times with retarded gypsum stucco under conditions that would, under the regular practices, give a wide difference in the time of set.

The stabilizer consists substantially of a retarder and a crystal-forming compound such as raw gypsum. To illustrate, the patentee makes this stabilizer by hydrolizing 800 lb. of hair with 80 lb. NaOH and 260 gal. H_2O under 150 lb. pressure. When hydrolysis is complete, dilute the volume to 260 gal., so as to always have uniform strength of solution, then add 1200 lb. CaO or clay or any inert filler, after which 2000 lb. pulverized $CaSO_4 \cdot 2H_2O$ is added and thoroughly incorporated. The resulting paste is dried and pulverized to 350 mesh.

It is claimed that by adding 10 to 20 lb. of this stabilizer to a gypsum stucco, uniform setting times will be obtained under any unfavorable conditions.

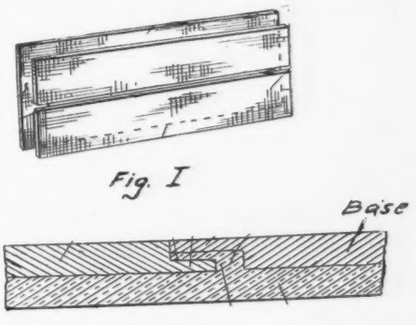
An ordinary retarded stucco gave setting times of 900, 285, 45 and 427 minutes under given conditions. Some of the same stucco retarded with the new stabilizer and used under exactly the same conditions gave a setting time of 295, 305, 250 and 350 minutes. *Alfred Hugh Gallagher, U. S. Patent No.* 1,683,539.

A Cementitious Binder. A cheap, waterproof binder or cement that is recommended for a variety of uses, including road work, is described in the patent claim.

Sodium silicate and calcium carbonate are mixed under certain given conditions and a cement with controlled setting properties is obtained. The setting action is not due to evaporation, as is the case with ordinary sodium silicate, but is a result of a chemical combination. Calcium phosphate, portland cement and calcium hydroxide can be used in place of the lime carbonate.

The resulting cement is claimed to become waterproof on standing when $CaCO_3$ or Ca_3PO_4 is used; the time required for waterproofing decreases as the alkalinity of the silicate solution increases, and when CaO or portland cement is used, the time required for waterproofing is lengthened as the alkalinity increases. *John D. Carter, U. S. Patent No.* 1,681,570.

Improved Type of Plaster Board. A plaster board comprising a series of panels having a roughened outer surface for holding plaster applied to that surface for a finish or brown coat. The primary object of the patent being to provide a plaster base carrier, Fig. 1, that will be practical and that will tend to protect or reinforce each other, especially at the edges. The panels are made in comparatively small sizes and are nailed to the studding or wall, it not being necessary to saw or otherwise cut the panels to meet or lap at a studding mem-



Lap features of a new plaster wallboard

ber. The panels are provided with flanges which overlap each other, and these flanges are reversed on opposite edges. The overlapping flange and its complement on the adjoining flange are of different widths and provide a channel for the forming of the key for the plaster coating (Fig. 2) applied to the base. This feature tends to reinforce the wall at the junction of panels and overcomes one of the objections to ordinary plaster board, which does not allow any thicker body of plaster over the joints formed.—*Hans E. Hanson, assigner to Celotex Co. of Chicago, Ill., Reissue No.* 17,007.

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended Sept. 22	Limestone Flux Week ended Sept. 29	Sand, Stone and Gravel Week ended Sept. 22	Sand, Stone and Gravel Week ended Sept. 29
Eastern	3,882	3,849	18,377	18,791
Allegheny	4,358	4,386	10,954	11,595
Pocahontas	573	537	1,016	986
Southern	898	725	11,218	12,481
Northwestern	1,559	1,500	9,728	9,760
Central Western	622	542	12,343	12,241
Southwestern	468	466	7,843	7,450
Total	12,360	12,005	71,479	73,304

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1927 AND 1928

District	Limestone Flux Period to Date 1927 Oct. 1	Limestone Flux Period to Date 1928 Sept. 29	Sand, Gravel and Stone Period to Date 1927 Oct. 1	Sand, Gravel and Stone Period to Date 1928 Sept. 29
Eastern	133,334	115,061	418,995	419,655
Allegheny	138,932	132,062	325,240	284,699
Pocahontas	20,248	18,189	37,602	31,558
Southern	22,701	22,784	475,195	410,973
Northwestern	52,996	52,490	281,469	256,555
Central Western	19,703	17,124	366,300	399,619
Southwestern	13,308	15,957	222,532	240,116
Total	401,222	373,667	2,127,333	2,043,175

COMPARATIVE TOTAL LOADINGS, 1927 AND 1928

	1927	1928
Limestone flux	***401,222***	***373,667***
Sand, stone, gravel	***2,127,333***	***2,043,175***

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning October 20:

SOUTHERN FREIGHT ASSOCIATION DOCKET

42163. **Crushed stone** from Coalville and Regal, N. C., to points in C. F. A. and I. F. A. territories. It is proposed to establish commodity rates on stone, crushed, carloads (See Note 3), except as noted—from Coalville and Regal, N. C., to destinations in C. F. A. and I. F. A. territories—same as rates in effect from Whitestone, Ga. Statement of the proposed rates to the destinations here involved will be furnished upon request.

42172. **Shale,** from Vinings, Ga., to Durham and Wilson, N. C. Combination rates now apply. Proposed rates on shale, in bulk, carloads (See Note 1), from Vinings, Ga.: To Durham, N. C., 266c; to Wilson, N. C., 275c per net ton.

42358. **Ground limestone,** for agricultural purposes, between points on the L. & N. R. R. in the state of Kentucky. It is proposed to provide for rates on limestone, ground, for agricultural purposes, in open top cars, carloads (See Note 3) (Shipper must execute a certificate indicating that the ground limestone is to be used for agricultural purposes, between points on the L. & N. R. R. in the state of Kentucky, intrastate only) the same as apply on crushed stone.

42172, Amendment 1. **Shale,** from Vinings, Ga., to Dunn and Wilson, N. C. Submittal No. 42172, included in Docket No. 440, for October 22 hearing, proposes rate of 266c per net ton to Durham, N. C., and 275c per net ton to Wilson, N. C., on shale, from Vinings, Ga. This proposition is now amended to provide that the suggested rate of 266c per net ton is to apply to Dunn, N. C., instead of Durham, N. C.

SOUTHWESTERN FREIGHT BUREAU DOCKET

15877. **Crushed stone,** from Carthage, Mo., to North McAlester, Okla. To establish rate of 11c per 100 lb. on stone, broken, crushed or ground, carloads, minimum weight 50,000 lb., except when for carrier's convenience car of less capacity is furnished, in which event the marked capacity of car, but not less than actual weight, will govern, from Carthage, Mo., to North McAlester, Okla. At the present time the 11c rate from Carthage, Mo., to North McAlester, published in Item 3360 of S.W.L. Tariff 44-O, is restricted to apply only via the St.L.-S. F. Ry., Muskogee, Okla., and the M.-K.-T. R.R., and in order to permit competing lines to enjoy this traffic, it is desired to establish routing via the Mo. Pac. R. R., Joplin, Mo., and the M.-K.-T. R. R.

Note 1—Minimum weight marked capacity of car.
Note 2—Minimum weight 90% of marked capacity of car.
Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

15882. **Crushed stone** between points in Kansas and points in Oklahoma. To amend Items 6998A and 7000A of S. W. L. Tariff 44-O, applying on gravel, crushed stone, sand, etc., between points in Kansas and points in Oklahoma by adding the Osage Ry. as a line in connection with which distance rates in those items apply. Shippers state that in view of the compromise effected in settlement of I. C. C. Docket 19039, it being understood that rates would be made applicable in connection with Osage Ry., there is no good reason why this has not been done.

15985. **Crushed stone,** from points in Texas to points in Louisiana. To establish rate of $3.16 per ton of 2000 lb. on crushed stone, natural, carloads, ranging in size up to 200 lb. in weight, minimum weight 25 tons of 2000 lb. per car, except when marked capacity of car used is less, in which event the marked capacity shall govern, from Dittlinger and New Braunfels, Tex., to New Iberia and Port Barre, La. The establishment of the above rate, it is stated, will eliminate fourth section departures.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

15476. **Sand, fire, sea and core,** carloads (See Note 2), from Provincetown, Mass., to Portland, Me., 15½c. Reason—To provide rate to Portland, Me., comparable with those now in effect to Biddeford and Salmon Falls, Me.

WESTERN TRUNK LINE DOCKET

1564-O. **Stone, crushed,** carloads, usual minimum weight, from Sioux Falls, Dell Rapids, S. D., and Pipestone, Minn., to stations in Iowa and Minnesota, on both local and joint traffic. Present, various rates. Proposed—To provide the Nebraska intrastate distance basis for single or joint haul traffic, as case may be, as a distance scale under which rates could be published from Dell Rapids, Sioux Falls, S. D., and Pipestone, Minn., to destinations in Iowa and Minnesota whenever occasion may require such action. In making rates from Dell Rapids and Sioux Falls, the average distance from both points to destinations involved to be used from both points.

2310G. **Sand and gravel, sand pit strippings, gravel pit strippings,** carloads (See Note 3), but in no case shall the minimum weight be less than 40,000 lb.

To Dubuque, Ia.

From	Pres.	Prop.
Portage, Wis.	$1.70	$1.50
Berlin, Wis.	2.10	1.60

To Davenport, Ia.

From	Pres.	Prop.
Berlin, Wis.	$2.40	$1.60

3527A. **Stone, broken, crushed or ground,** carloads, from Ohio River crossings, viz., Brookport, Cairo, Ill., Evansville, Ind., Gale, Joppa, Metropolis, Mounds and Thebes, Ill., to Kansas City, Mo., Omaha, Neb., etc., in Agent Speiden's 66D. Present rates, classification basis. Proposed—Amend Item 674, page 55 of Agent Speiden's Tariff 66D, and include in commodity description "Stone (broken, crushed or ground, carloads)."

4092C. **Sand, chatt,** carloads, minimum weight 80,000 lb., or if marked capacity of car is less than 80,000 lb., marked capacity will govern, from Joplin, Webb City, Oronogo, Carterville, Smithfield, Carl Jct., Mo., and Galena, Kan., to Sandstone, Minn. Present rates, class; proposed, establish rate of 19½c per 100 lb.

CENTRAL FREIGHT ASSOCIATION DOCKET

19741. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel,** carloads (See Note 3), from Wolcottville, Ind. (rates in cents per net ton):

To N. Y. C. stations:	Prop.	Pres.
Batavia, Mich.	82	92
Coldwater, Mich.	87	94
Allen, Mich.	92	104
Jonesville, Mich.	97	115
Hillsdale, Mich.	97	115
Osseo, Mich.	102	115
Hudson, Mich.	105	127
To M. C. R. R. stations:		
Battle Creek, Mich.	102	270
Marshall, Mich.	110	280
To Penn. R. R. stations:		
Sturgis, Mich.	60	63
Nottawa, Mich.	66	76
Wasepi, Mich.	66	76
Mendon, Mich.	70	76
Vicksburg, Mich.	75	240
Austin Lake, Mich.	75	260
Indianfield, Mich.	80	260
Kalamazoo, Mich.	80	270
Cooper, Mich.	85	280
Plainwell, Mich.	85	290
Monteith, Mich.	90	290
Martin, Mich.	90	290

19747. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), **gravel** and **crushed stone,** carloads (See Note 3), from Kenneth, Lake Ciecott, Ind., to Webster, Eastburn and Watseka, Ill., on the T. P. & W. R. R., 88c per net ton. Present rate, 80c per net ton.

19748. To establish on **sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) or **gravel,** carloads (See Note 3), Harbor Bridge, Penn., to New Castle, Penn., 50c per ton of 2000 lb. Present rates, 40c and 50c per ton of 2000 lb., for local and connecting line deliveries, respectively.

19750. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel,** carloads, Wolcottville, Ind., to Ada, O., via Penn. R. R., 115c per net ton. Present rate, 330c per net ton, sixth class.

19751. To establish on **crushed stone,** carloads, Melvin, O., to Cairo, West Union, Clarksburg and Grafton, W. Va., in cents per net ton:

To	Prop.
Cairo, W. Va.	140
Clarksburg, W. Va.	160
Grafton, W. Va.	170
West Union, W. Va.	150

Present rate, 24c, sixth class.

19767. To cancel rate of 70c per gross ton on **crushed stone,** carloads, West Columbus, O., to Van Wert, O., applying via Dunkirk and Penn. R. R., also via St. Marys, N. Y. C. & St. L., Celina and C. N., as published in N. Y. C. Tariff I. C. C. OC-230, applying in lieu thereof Official Classification basis.

19782. To establish on **crushed stone,** carloads, Monon, Ind., to Veedersburg, Waynestown and Hillsboro, Ind., rate of 101c per net ton. Present rate, 115c per net ton.

19784. To establish on **crushed stone** and **crushed stone screenings,** carloads, Delphos, O., to Ohio

destinations shown below, following rates in cents per ton of 2000 lb.:

To	Prop.	To	Prop.
Bryan	95	Scott	85
Ney	95	Cavett	85
Moats	95	Van Wert	85
Sherwood	85	Rockford	80
Cecil	85	Tama	80
Paulding	85	South Tama	80
Latty	85	Celina	80
Haviland	85		

Present rate, sixth class.

19791. To establish on **crushed stone**, carloads, Keeport, Ind., to destinations shown below, following rates. Present and proposed rates, in cents per net ton:

To	Pres.	Prop.
North Judson, Ind.	115	105
Beardstown, Ind.	107	105
Kewanna, Ind.	101	88
Fulton, Ind.	97	88
Santa Fe, Ind.	82	75
Amboy, Ind.	87	75
Converse, Ind.	88	75
Sweetser, Ind.	97	80
Mier, Ind.	97	80
Marion, Ind.	97	80
Jonesboro, Ind.	104	101
Fowlerton, Ind.	107	101
Gaston, Ind.	107	101
Muncie, Ind.	115	101
Richmond, Ind.	138	127
Webster, Ind.	138	127

Route—Wabash Ry., Peru, Ind., and C. & O. Ry.

19796. To establish on **firestone**, carloads, Amherst and Berea, O., to Detroit, Mich., rate of 9c Present rate, 11½c.

19805. To establish on **crushed stone** and **crushed stone screenings**, carloads, from Delphos, O., to Edgerton, Ind., rate of 85c per 2000 lb. Route, via N. Y. C. & St. L. R. R. direct. Present rate, sixth class.

19808. To establish on **crushed stone**, carloads, McCook, Ill., to points in Indiana, rates as shown below. Present and proposed rates, in cents per net ton., from McCook, Ill.:

To	Pres.	Prop.
Lakeville, Ind.	115	105
Wyatt, Ind.	120	110
Wakarusa, Ind.	120	110

Route, B. & O.-I. H. B., Tolleston, Ind., Wabash, or via I. H. B., Tolleston, Ind., Wabash.

19815. To establish on **crushed stone**, carloads, from Holland, Mich., to Ottawa Lake, Mich., rate of 65c per net ton. Present rate, 75c per net ton.

TRUNK LINE ASSOCIATION DOCKET

19712. **Gravel and sand**, other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads (See Note 3), from North East, Md., to Bacon Hill, Md., rate of 70c per ton of 2000 lb. Reason—Rate fairly comparable with others of similar haul.

19713. **Stone, crushed**, carloads (See Note 3), from Jamesville and Rock Cut, N. Y., to Auburn, N. Y., rate of 91c per net ton. Reason—Rate comparable with rate in force from Oak's Corners, N. Y.

19717. **Limestone, ground or pulverized**, carloads, minimum weight 50,000 lb., from Engle, W. Va., Duffields and Shenandoah Jct., W. Va., rate 3½c per 100 lb. Reason—Rate compares favorably with others for like movement.

ILLINOIS FREIGHT ASSOCIATION DOCKET

4693. **Crushed stone**, carloads, to Belleville, Ill. Rates in cents per ton of 2000 lb.

From Falling Springs (T. R. R. A.) To Belleville, Ill.	Pres.	Prop.
I. C.	75	70
L. & N.	63	60
Southern	53	60
From Krause, (I. C.)		
I. C.	60	*
From Krause (Mo. Pac.)		
L. & N.	73	70
Southern	73	70
From Krause (M. & O.)		
I. C.	74	74
L. & N.	73	70
Southern	63	70
From Stolle (I. C.)		
I. C.	60	*

*No change.

Cement and Distance Rule in South and West

IN a second supplemental report on further consideration, in No. 15806, Lehigh Portland Cement Co. vs. Aberdeen & Rockfish et al., the Commission has modified the rule for computing distances in connection with rates prescribed in the original report, 132 I. C. C. 427. The report also includes a sub number, Alpha Portland Cement Co. vs. Ashland Coal & Iron Co., No. 15900, Security Cement & Lime Co. vs. A. & R. et al., and a sub number thereunder, Tidewater Portland Cement Co. vs. A. & R. et al. In the report, written by Commissioner Eastman, the Commission said:

In our original report in these cases we prescribed a distance scale of rates on cement, in carloads, to destinations in southern territory from cement-producing points in that territory and also in official territory, including westbank Mississippi river points in Missour, such as St. Louis, Hannibal and Marquette, where cement mills are situated. Distances for use in connection with this scale were required to be based on the shortest routes over which carload traffic can be moved without transfer of lading, as stated in Appendix B to the report.

Subsequently in Iola Cement Mills Traffic Assn. vs. A. & V. Ry. Co., 144 I. C. C. 585, division 1, prescribed rates on cement from Hannibal and Marquette to destinations in Arkansas and Louisiana, among others, on the basis of western cement scale III, slightly higher than the southern scale, with a different rule for computing distances than that prescribed in the instant proceeding. Under the latter rule distances from Hannibal, St. Louis and Marquette to destinations such as Memphis, Tenn., are based on routes through the territory west of the Mississippi river, where those routes are shorter, than the eastside routes. As a result the rates to Memphis from the points above named are lower than those prescribed in the Iola case, to Arkansas destinations directly intermediate, causing violations of the long-and-short-haul provision via direct routes.

Upon further consderation we are of the view that, since the scale prescribed in this proceeding was intended to reflect transportation conditions in official and southern territories rather than in western territory, for which we have prescrived a diffeent basis of rates, the rule for the computation of distances should be restricted so as not to require use of the westside routes in computing distances. Accordingly the second paragraph of Appendix B to the original report, 132 I. C. C. 474, will be amended to read as follows:

"In computing distances for the application of the foregoing scale the shortest routes shall be used over which carload traffic can be moved without transfer of lading, but where the shortest is in whole or in part over the road of a short or weak line the arbitrary provided for such short or weak lines shall be included in determining the rate, and if a longer route wholly over a standard line or lines makes a lower rate, such lower rate shall be applied. Distances from westbank Mississippi river points in Missouri, however, shall be based so far as possible on routes operating in territory lying east of the Mississippi river and not on the so-called westside routes via the lower Mississippi river crossings."—*Traffic World.*

Rates on Sand and Gravel in Southern Illinois

AT the meeting before Examiner Fuller at Chicago, October 15, in connection with the two interstate cases involving rates on sand, gravel and crushed stone from Indiana points to destinations in Illinois south of the line of the Pennsylvania from St. Louis to Terre Haute, it was decided to defer action until after the issuance of the orders by the Illinois commission in the two cases before it involving rates in the same territory. The interstate cases are I. and S. 3093 and supplemental order, and docket 21372, brought by the Ohio and Indiana Stone Co. and the Mid-West Crushed Stone Co.

It was understood that the parties to the I. and S. case were prepared to proceed with a hearing. But, following the expression from a number of those present that the entire matter of the adjustment in the territory should be made the subject of a general investigation by the Commission, it was decided to postpone further action until the Illinois commission had disposed of its cases. As expressed by E. R. Pister, of the Big Four, considerable progress had been made toward settlement of the issues in the course of the recent conferences and the institution of a general investigation by the commission would make it possible to complete the work begun. Parties to the complaint case expressed the belief that they would be able to compromise their differences.

Following more or less informal discussion of the proposal for a general investigation, Examiner Fuller stated that action would be postponed until the Illinois cases had been decided and that then no action would be taken on the suggestion with respect to a general investigation unless it was clear that a controversy existed as to the measure of the rates from northern Illinois into the territory. The various parties present were asked to advise the Commission of their views, with respect to the action called for, following the issuance of the orders by the Illinois commission.—*Traffic World.*

I. C. C. Decisions

19635. Core Sand Rate. Rate on core sand from Michigan City, Ind., to Moline and Rock Island, Ill., not unreasonable, unduly prejudicial or in violation of the aggregate-of-intermediates clause of the fourth section. Case dismissed.

19772. Sand Rate. Combination rate on sand from Dixiana (Powell's Switch), S. C., to Almond, N. C., found not applicable and reparation awarded to the Columbia Sand Co. Rate charged was 203 cents per net ton.

19328. Slate Granules Rate. Rate on slate granules from Poultney, Vt., to Scranton, Penn., found unreasonable to the extent it exceeded 16 cents. Reparation awarded.

19417. Molding Sand Rates. Rates on molding sand from Leedy, Miss., to Indianapolis and Noblesville, Ind., Chicago and Abingdon, Ill., and Milwaukee, Wis., unreasonable to the extent that the rates for the future might exceed the following: To Indianapolis, $3; Noblesville, $3.10; Abingdon, $3.20; Chicago, $3.25, and Milwaukee, $3.55 per net ton. New rates prescribed to be effective not later than July 5, 1928.

19489. Lime. Rates charged on lime from Knoxville, South Knoxville Extension, and River Front Extension, Tenn., to Braithwaite, La., found inapplicable but not unreasonable and reparation awarded. Rate of $3.93 applicable prior to October 10, 1927, found not unreasonable, but shipments delivered prior to that date were overcharged and refund directed accordingly. Rates established on October 10, 1927, of $4.80 and $3.96 for minimum weights of 30,000 and 50,000 lb. respectively, which will care for situation in the future.

E. A. Lansrud Fatally Injured in Premature Blast at Des Moines

E. A. LANSRUD, general manager of the Independent Sand and Gravel Co., Des Moines, Iowa, died at the Iowa Lutheran hospital at Des Moines, October 1, from the effects of injuries received earlier in the day when a stick of dynamite exploded.

The accident occurred at the gravel plant of the company near Valley Junction, west of Des Moines. Mr. Lansrud and A. O. Hauge, president of the company, and Mr. Lansrud's two sons had gone there to inspect the blasting of stumps to make room for extensions of the gravel pit. A stick of dynamite near Mr. Lansrud and Hague exploded prematurely, shattering the former's right arm and burning the latter's face. The young men were some distance away and were uninjured. They were able to render first aid and stop the bleeding of their father's wound.

It was at first thought by the surgeon that amputation of Mr. Lansrud's arm would be the most serious result, but a relapse took place during the early part of the night with death following.

Mr. Lansrud was a member of the board of supervisors of Worth county for several terms, starting about 15 years ago. At that time he lived on his farm in Brookfield township, but later moved to Kensett, from where he moved to Des Moines to become associated with the sand and gravel company. He is spoken of as one of the most constructive commissioners of the county and his work was along forward looking lines. Mr. Lansrud had also held other places of trust in this county.—*Norwood* (Iowa) *Anchor.*

New Wisconsin Granite Project Being Developed

FORMATION of a company headed by Arthur A. Appleyard, Minneapolis, Minn., capitalist and member of the New York stock exchange, to develop the black granite quarries at Mellen, Ashland county, Wisconsin, with an initial expenditure for equipment of nearly half a million dollars, was announced recently.

Quarrying of the black stone which is said to be found nowhere else except in Switzerland, began about nine years ago when Julius Effenberger, a Swiss, discovered the rock and opened a small quarry. His interests and those of his brother are absorbed in the new concern. The stone has been used in the Marshall Field building at Chicago and in the Federal Reserve bank at Detroit.

One hundred men will immediately begin construction of new buildings and 200 will receive regular employment when the new quarries are in full operation, which will be early next year.

New construction will include a finishing plant, a crushing plant, and a railroad siding. This will be followed by the installation of machinery.—*Wausau* (Wis.) *Record-Herald.*

D. N. Armstrong

D. N. ARMSTRONG, for many years vice-president and general manager of the Missouri Portland Cement Co., passed away suddenly in St. Louis on the afternoon of Thursday, October 18. Mr. Armstrong, who was in active charge of the manufacturing operations of the Missouri Portland and of its predecessor, the Union Sand and Material Co., was well known in the rock products industry. He took an active part in the work of the Portland Cement Association and other trade groups, and traveled extensively. He was for three consecutive years chairman of the Portland Cement Association committee on accident prevention and insurance, and in that capacity was responsible for many of the advanced practices to which the success of that work may be largely attributed.

D. N. Armstrong

Wisconsin High Calcium Marl Deposit To Be Developed

LIME LAKE, containing a vast tonnage of high grade marl, has been sold by the Wisconsin Marl Co. to Bert Somers and Joe Piotrowski, Fancher farmers, who own and operate a marl excavating machine.

There has been considerable litigation in courts since 1924 with reference to the ownership of the marl in the lake, the Wisconsin Marl Co., with headquarters at Plainfield, claiming that it had absolute title to the marl. Following a hearing at Stevens Point in November, 1924, called by the state railroad commission, the decision was rendered by the commission that the marl in the lake was owned by the state and permission was granted Messrs. Somers and Piotrowski to dig it.

The Wisconsin Marl Co., however, appealed the decision and after several years of litigation it was decided that the marl was state property, but that the company had title to a strip of land surrounding the lake and that marl could not be excavated without permission of the company.

No further action was taken by Messrs. Somers and Piotrowski until early this summer, when following a number of conferences with the Plainfield representative of the company the deal was made whereby the property of the company was sold to Messrs. Somers and Piotrowski, giving them absolute title to all of the shore property.

A marl excavating machine will soon be erected and will pile up from 500 to 1000 cu. yd. of marl. For more than six years farmers in this territory have been interested in the Lime lake marl. At one time a survey was made by local farmers and O. R. Zeasman, of the state soils department, to find out whether it was possible to lower the lake by dredging an outlet to a nearby stream. Since the lake is located about five miles from Amherst and touches the towns of Buena Vista and Lanark, it is likely that many thousands of tons of marl will be used annually on agricultural land.

It is interesting to note that in a publication prepared by the Wisconsin Marl Co., probably 25 years ago, the marl was considered of value as soil fertilizer. However, comparison was made then to Kainit, a potash fertilizer, and it was claimed that the lime would produce the same results as Kainit, which was quoted at $21.50 per ton. The marl deposits of the company as written up in the publication analyzed from 85.3 to 89.5% carbonate of lime, which is a very high analysis for Wisconsin limestone.

Apparently 25 years ago, or when the publication was printed, little was known as to where to use marl, for it was then recommended to be used on the deep black muck soils of the large tracts of marsh lands of Wisconsin. It was claimed that these black muck soils required additional lime or marl to bring about and hasten the process of nitrification or decomposition of the organic matter.—*Stevens Point* (Wis.) *Journal.*

Chicago Sand and Gravel Producer Enlarges Facilities

PURCHASE of one of the largest remaining dock sites on the Calumet river is announced by the Material Service Corp., Chicago, Ill., from the Calumet Trust Co. Located at Ninety-second St. and Ewing Ave., the dock has an area of 7½ acres, with 645 ft. of frontage on the river and 800 ft. of frontage on the E. J. & E. Railroad.

Distributors of gravel, stone, torpedo and lake sand, the company, which also owns a dock on the north branch of the Chicago River at Halsted St. and Chicago Ave., is completing a new plant at Lockport which will have a capacity of 5,000 tons of building material per day. It is also building a special type boat at Sturgeon to be used exclusively between the Lockport plant and its two Chicago docks.

Cement Products

Pumping Bulk Cement in a Ready-Mixed Concrete Plant

Golden Gate Atlas Materials Co. Uses "Quick Service" and "Accurate Proportioning" as Biggest Selling Points in Distributing Mixed Concrete to the San Francisco Area

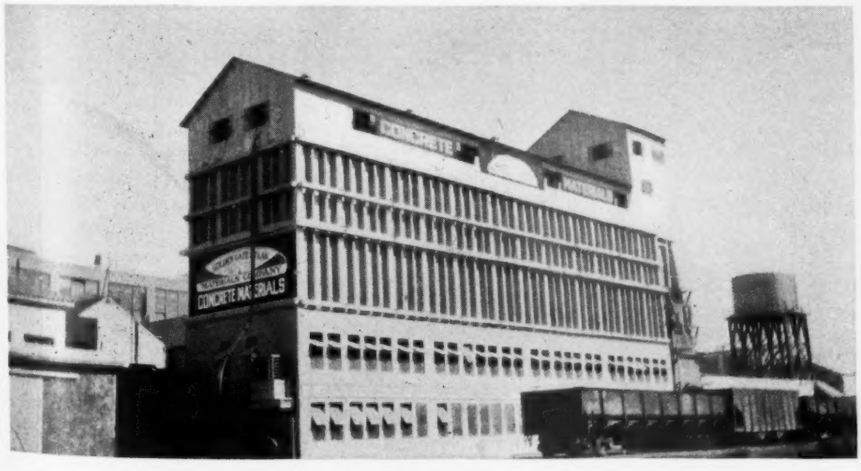
TO MEET the growing demand for ready-mixed concrete in different parts of the country, plants for producing this product are being built in many of the large metropolitan areas from the Atlantic to the Pacific. One of the latest of these, and one of the most interesting from an operating point of view is the new plant of the Golden Gate Atlas Materials Co. at San Francisco, Calif. While like other concrete materials batching plants in many respects, it differs in one special feature—the use of an air pump to raise the cement from the track hopper to the overhead bins.

The plant is constructed of wood with the top story and roof of corrugated iron. It stands about 50 ft. above the ground except at the end where the elevators rise, which is somewhat higher to accommodate the elevators and their drives. The ground floor of the plant is taken up with a driveway through which the trucks drive for loading from the bins above. Above this level, the building is divided into four main compartments, which are approximately square. In the center of each compartment is a circular steel bin for cement. Beside these bins each compartment is divided by vertical partitions into four smaller bins, two on one side being for sand, and the two on the other side being for crushed stone. Exactly below the center of each of the four main compartments is a batching box for accurately weighing the amount of material delivered to the trucks. The height of the plant permits all of the material being delivered by gravity to the trucks. Thus there are four complete units in the plant to deliver the batched materials to the trucks, any one of which can be operated separately from all the others.

Plant Layout

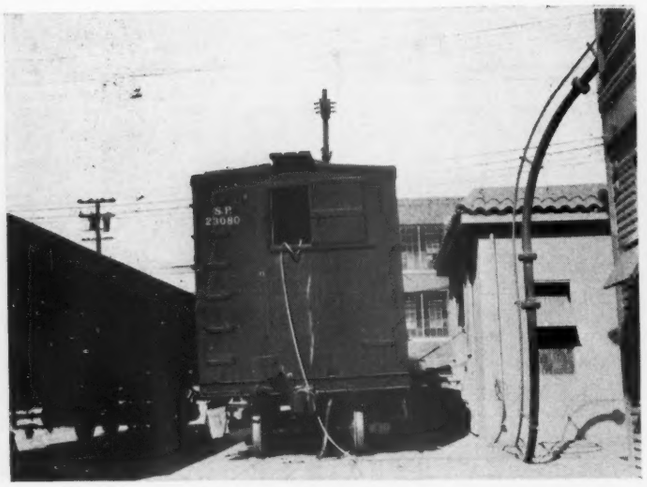
This plant differs from some other ready-mixed concrete plants in that the product is not mixed at the plant itself, but is mixed in Barrymore mixing trucks on the way to the job. Batched material can be delivered to any truck at the Golden Gate plant, but only when the company's mixing trucks are used can mixed concrete be furnished.

The car-unloading hopper at the left and the main plant behind showing the lift of the pipe

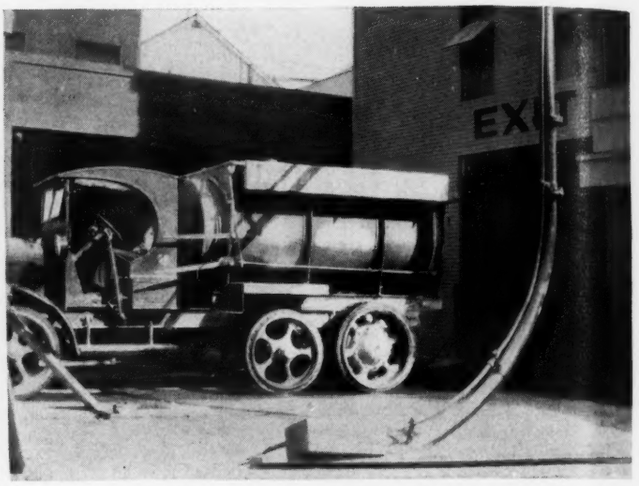


The new plant of the Golden Gate Atlas Materials Co. showing the unusual type of construction used

Cars bringing sand and crushed rock for the plant are spotted over the hoppers on the company's siding and dumped. These hoppers are at the opposite end of the plant from the hopper through which the bulk



Unloading a car of cement to the hopper beside the track. The pipe line is at the right

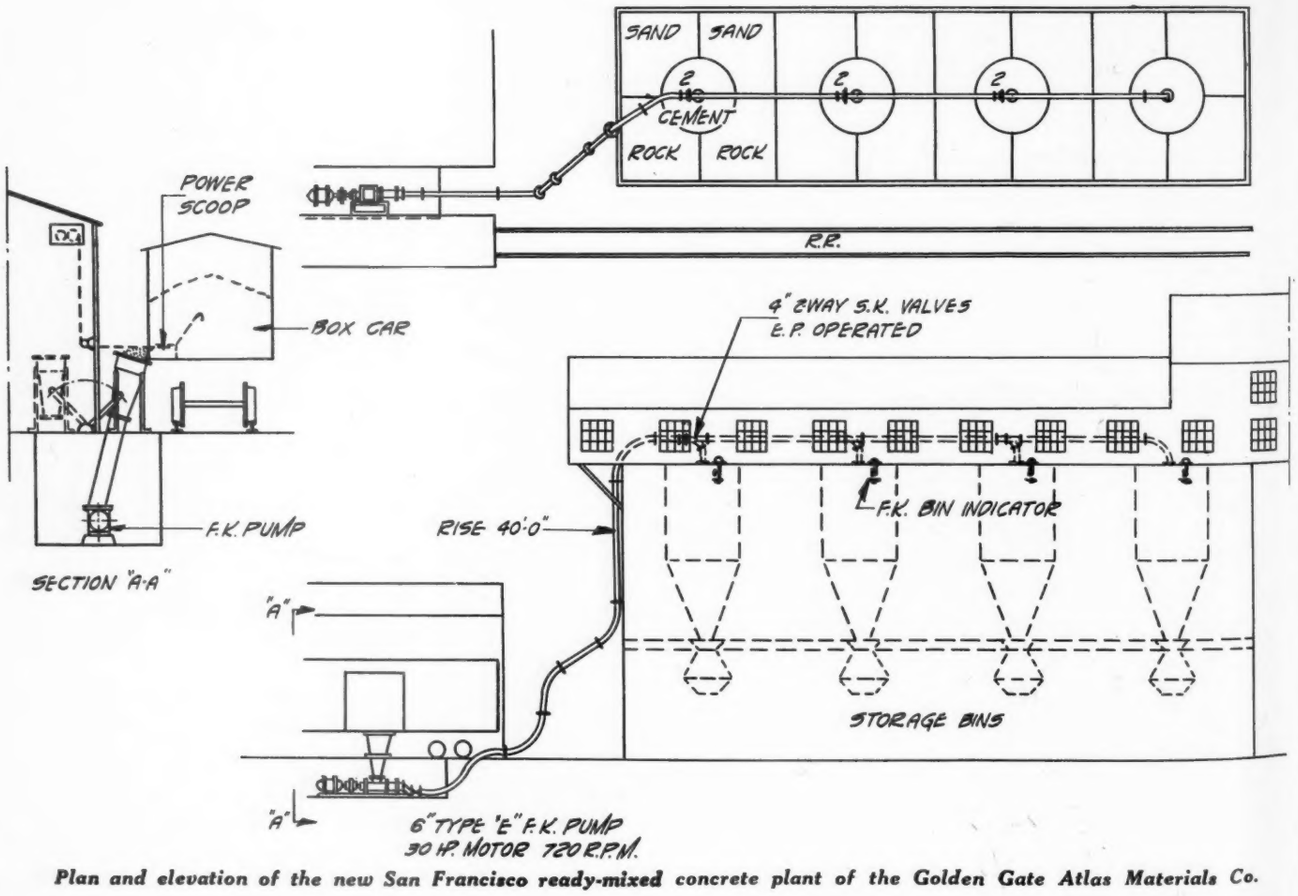


One of the mixing trucks, used in delivering the batched material, leaving the plant

cement is handled. The aggregate material is then fed from the hoppers to the two bucket elevators which are placed at this end of the plant, the sand being taken up one elevator and the crushed stone up the other. As all of the sand bins are along one side of the plant, and all of the stone bins along the other, this permits the use of two belt conveyors over the tops of the bins, delivering the material to any desired sand bin, or any desired stone bin, as the case may be.

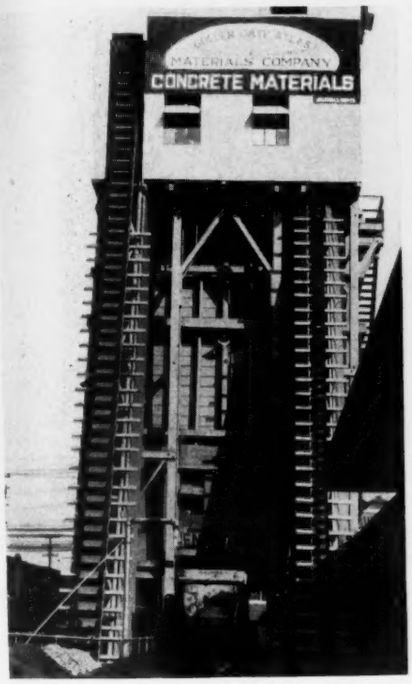
The feature of the plant is the pumping of the bulk cement For this a complete Fuller-Kinyon pumping system is used. The box cars containing the bulk cement are spotted beside the cement hopper which is located a few feet beyond the end of the plant and directly beside the small building containing the pumping equipment. To deliver the bulk cement from the car to the hopper, a small power scoop is used, which is operated from the small building above mentioned. From the hopper, the cement falls through a spout directly to a 6-in., type "E," Fuller-Kinyon pump, operated by a 30-hp. motor. This pump forces the cement through a 4-in. pipe line to the steel bins at the top of the plant. The rise is 40 ft. and the maximum pumping distance to the farthest bin is 130 ft., which includes the rise. With this conveying system 150 bbl. of cement can be raised to the top of the plant in an hour.

The equipment of the pumping system at the bins includes a two-way valve on the



Plan and elevation of the new San Francisco ready-mixed concrete plant of the Golden Gate Atlas Materials Co.

line for each of the first three bins in the row. These valves permit filling any bin as desired. The valves are manually operated, but each bin is equipped with a Fuller-Kinyon bin indicator to show when it has been filled. At this plant, no storage is provided for the cement except the four large steel bins above the batch boxes. These bins apparently provide ample storage capacity. The whole pumping system is stated to be simple and efficient in its operation.



The two bucket elevators which raise the crushed stone and sand from the track hopper to the overhead bins

In using this concrete, the correct amount of cement, rock, sand and water is first determined. Engineers recognize that the latter ingredient is an important factor in the strength of the concrete, and when this method of supplying the mix is used, the water content can be governed as accurately as can the amount of any other ingredient. The specified amount of each material is then delivered dry to the Barrymore truck, and the required water is placed in a tank on top of the truck. This truck is made in much the shape of a barrel mixer, with regular mixing blades installed in the body. As the truck carries the batch to the job, the dry materials can be mixed, and at the job the water from the tanks is added for the final mixing. This combined use of batching loaders and mixing trucks makes for an accurately controlled mix and quick service in delivering concrete to the job. Since these two things are the most important factors in selling ready-mixed concrete, it can be readily seen that the Golden Gate Atlas Materials Co. has shown the way to many other ready-mixing plants over the country in this matter.

Note the substantial construction in this close-up view of the Golden Gate plant, which also clearly shows the height to which the cement is pumped

S. B. Lawrence Co. to Build Large Products Plant

PLANS for the erection of a modern cement block and ornamental concrete plant were announced recently by the S. B. Lawrence Co. of Lancaster, Penn., following the purchase of two acres of land south of New Holland avenue in Lancaster. It is stated that the new plant will be 175x300 ft. in size and will be of one story. Modern automatic cement products machiner will be installed, thus making possible a larger output than is reached at the present plant. Work on the plant will start next April, and will be completed in four or five months, according to the present plans which the company has just announced.

The Lawrence company came to Lancaster in 1922 from Marietta, Ohio, where it had operated successfully for five years. At present the company is located in the buildings formerly occupied by the Rowe Motor Co. During the past year the company expanded rapidly and has outgrown its present quarters. At this time it is manufacturing 40,000 concrete blocks for the new Neffsville school building.

Several months ago the company was incorporated with capital stock of $50,000. S. B. Lawrence is president; E. M. Lawrence, vice-president, and H. M. Lawrence, secretary-treasurer.

In addition to manufacturing blocks, the company manufactures concrete ornamental work, a comparatively new art in the building trade. The capacity for turning out this kind of work will be increased when the new plant is in operation.—*Lancaster* (Penn.) *Examiner and New Era.*

James River Concrete Pipe Corp. to Make Improvements

THE James River Concrete Pipe and Products Corp., Buchanan, Va., has decided to enlarge the present facilities of its plant, due to a continued demand for its product. For the past year the company has been turning out chiefly concrete pipe in sizes suitable for road culverts, measuring from 15 in. up to 48 in., but there has been such an increased demand for the smaller sizes for sanitary and drain pipe purposes that the improvements have been necessary. A Martin pipe machine will be installed and other improvements made so that the total cost will reach about $10,000. The machine is now being installed, and it is stated that the new sizes of pipe will be ready for distribution with a short time. The plant will be entirely electrically operated. J. S. Lackland is president and general manager of the company.—*Buchanan* (Va.) *News.*

Marysville Cement Products Co.

A NEW cement brick plant has recently been built by Martin Lewis at Marysville, Wash., according to the *Marysville Globe*. The plant was built to provide that locality with a plain and fancy brick of portland cement base and Mr. Lewis, who has had a wide experience in that field, should find a ready market for the products of his plant.

They are equipped to produce this type of brick and sell at prices that compare favorably with clay bricks of the same size. The Marysville Transfer Co. is handling the sale of the products of this plant.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	1.75	1.75	1.50	1.50	1.50
Chazy, N. Y.	.75	1.75	1.60	1.30	1.30	1.30
Dundas, Ont.	.53	1.05	1.05	.90	.90	.90
Farmington, Conn.	.....	1.30	1.10	1.00	1.00	.....
Frederick, Md.	.50@ .75	1.35@1.45	1.15@1.25	1.10@1.20	1.05@1.15	1.05@1.10
Ft. Spring, W. Va.	.40	1.35	1.30	1.25	1.20	.....
Munns, N. Y.	.75	1.40	1.30	1.25	1.00	.....
Prospect, N. Y.	.85	1.15	1.15	1.15	1.15	.....
Rochester, N. Y.—Dolomite	1.50	1.50	1.50	1.50	1.50	1.50
St. Vincent de Paul, Que. (n)	.75	1.35	1.15	.95	.85	1.20
Walford, Penn.	.....	.....	1.35h	1.35h	1.35h	1.35h
Watertown, N. Y.	1.00	1.75	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Afton, Mich.	.....	.....	.....	.....	.50	1.50
Alton, Ill.	1.85	.....	1.85	.....	.....	.....
Columbia and Krause, Ill.	1.05@1.40	.95@1.50	1.15@1.50	1.05@1.50	1.05@1.50	.....
Cypress, Ill.	1.00@1.25	1.00@1.25	1.20@1.25	1.20@1.25	1.20@1.25	1.35
Davenport, Iowa (f)	1.00	1.50	1.50	1.30	1.30	1.40
Dubuque, Iowa	.85	1.00	1.10	1.10	1.10	1.10
Stolle and Falling Springs, Ill.	1.05@1.40	.95@1.50	1.15@1.50	1.05@1.50	1.05@1.50	.....
Greencastle, Ind.	1.25	1.05	1.05	1.05	.95	.95
Lannon, Wis.	1.00	1.00	1.00	.90	.90	.90
McCook, Ill.	1.00	1.25	1.25	1.25	1.25	1.25
Marblehead, Ohio (l)	.55	.80	.80	.80	.80	.80
Milltown, Ind.	.....	.90@1.00	1.00@1.10	.90@1.00	.85@ .90	.85@ .90
Northern Ohio Points	.85@1.15	1.25	1.15	1.15	1.15	1.15
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	1.10
Stone City, Iowa	.75	.....	1.20	1.00	1.00	.....
Thornton, Ill.	.90	1.00	1.25	1.25	1.25	1.25
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Canada (m)	2.50	3.00	3.00	2.85	2.85	2.85
Valmeyer, Ill. (fluxing limestone)	.90@1.20	.....	.....	1.75	.....	1.75
Waukesha, Wis.	1.10	.....	.90	.90	.90	.90
Winona, Minn.	1.00	1.20	1.30	1.40	1.40	1.40
Wisconsin Points	.50	.....	1.00	.90	.90	.....
Youngstown, Ohio	.70j	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h
SOUTHERN:						
Cartersville, Ga.	1.20	1.65	1.65	1.45	1.15	1.15
Chico, Texas	1.00@1.40	.50@1.25	1.20	1.10	1.00	.90
Cutler, Fla.	.50@ .60r	.....	.....	1.75r	1.10@1.50r	.....
El Paso, Texas	.50@ .75	.50@ .75	.50@ .75	1.00@1.50	1.00@1.25	.75@1.00
Graystone, Ala.	Crusher run, screened, $1 per ton					
Kendrick and Santos, Fla.	3½ in. and less, $1 per ton					
Oliver Hill, Ky.	.50@1.00	1.00	1.00	.90	.90	.90
Rocky Point, Va.	.50@ .75	1.40@1.60	1.30@1.40	1.15@1.25	1.10@1.20	1.00@1.05
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.25	.....	1.25	1.25	1.00	.....
Rock Hill, St. Louis, Mo.	1.00	1.15@1.25	1.15@1.25	.90@1.20	.90@1.20	.90@1.20
Sugar Creek, Mo.	.75	1.00	1.20	1.20	1.20	1.20

(r) Cubic yard.

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn. (q)	1.20	1.60	1.45	1.35	.....	1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	.....
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Tex.	2.50	2.25	1.75	1.25	1.25	1.25
New Britain, Plainville, Rocky Hill, Wallingford, Meridan, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	.....
Northern New Jersey	1.35@1.40	2.00@2.10	1.80@1.90	1.40@1.50	1.40@1.50	.....
Richmond, Calif.	.75	.....	1.00	1.00	1.00	.....
Spring Valley, Calif.	.90@1.25	.90@1.25	.90@1.25	.90@1.25	.90@1.25	.90@1.25
Springfield, N. J.	.....	2.00	1.90	1.50	1.50	.....
Toronto, Canada (m)	.....	5.80	.....	4.05	.....	.....
Westfield, Mass.	.60	1.50	.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	.....
Cayce, S. C.—Granite	.....	.....	1.75	1.75	1.60	.....
Eastern Penn.—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Emathla, Fla.—Flint rock	1.00	.....	2.35	.....	.....	.....
Lithonia, Ga.—Granite	.75a	2.00b	1.75	1.40	1.35	1.25
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@3.00
Richmond, Calif.—Quartzite	.75	.....	1.00	1.00	1.00	.....
Somerset, Penn. (sand-rock)	.....	.....	1.50 to 1.85	.....	.....	.....
Toccoa, Ga.	.40	1.30	.....	1.25	1.30	1.30

(a) Sand. (b) to ¼ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Price net after 10c cash discount deducted. (f) 1 in to ¼ in., 1.45; 2 in. to ¼ in., 1.35. High calcite fluxing stone, 1.50. (h) Less 10c discount. (j) Less 10% net ton. (l) Less .05. (m) Plus 25 per ton for winter delivery. (n) Crusher run for ballast, .85. (p) Carload prices. (q) Crusher run, 1.40; ¾-in. granolithic finish, 3.00. (r) Cubic yd.

Agricultural Limestone

(Pulverized)

Alton, Ill.—Analysis, 98% $CaCO_3$, 0.01% $MgCO_3$; 90% thru 100 mesh.. 6.00

Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh 1.50

Blackwater, Mo.—100% thru 4 mesh.. 1.00

Branchton, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh..... 5.00

Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh..... 1.50

Cartersville, Ga.—50% thru 50 mesh.... 1.50

Pulverized, per ton..... 2.00

Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk..... 2.50

Cypress, Ill.—Analysis, 88% $CaCO_3$; 10% $MgCO_3$; 50-90% thru 4 mesh.. 1.25
50-90% thru 100 mesh..... 1.35

Danbury, Conn., and West Stockbridge, Mass.—Analysis, 90% $CaCO_3$; 5% $MgCO_3$; fine ground, 90% thru 100 mesh; bulk..... 3.50
Paper bags 4.75
100 lb. cloth bags..... 5.25

(All prices less .25 cash 15 days)

Davenport, Ia.—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 90% thru 200 mesh, bags, per ton..... 6.00
90% thru 20 mesh, bulk, per ton..... 1.50

Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh; sacked..... 5.00

Hot Springs and Greensboro, N. C.—Analysis, $CaCO_3$, 98-99%; $MgCO_3$, 42%; pulverized; 67% thru 200 mesh; bags 3.95

Bulk 2.70

Jamesville, N. Y.—Analysis 89% $CaCO_3$, 4% $MgCO_3$; pulverized; bags, 4.25; bulk..... 2.75

Joliet, Ill.—Analysis, 52% $CaCO_3$, 42% $MgCO_3$; 50% thru 100 mesh.... 2.50
90% thru 100 mesh..... 3.50

Knoxville, Tenn.—80% thru 100 mesh; bags, 3.95; bulk..... 2.70

Marlbrook, Va.—Analysis, 80% $CaCO_3$; 10% $MgCO_3$; bulk..... 1.75

Marl—Analysis, 95% $CaCO_3$; 0% $MgCO_3$; bulk 2.25

Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton..... 2.00

Middlebury, Vt.—Analysis 99.05% $CaCO_3$; 90% thru 50 mesh; bulk, 4.00; paper bags..... 5.00

Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk..... 1.35@ 1.60

Olive Hill, Ky.—50% thru 4 mesh..... 1.00
90% thru 100 mesh..... 2.00

Piqua, Ohio—Total neutralizing power 101.12%; 99% thru 10, 60% thru 50; 45% thru 100..... 2.50

100% thru 10, 90% thru 50, 70% thru 100; bags, 5.00; bulk..... 3.50

100% thru 4, 30% thru 100, bulk..... 1.50

Rocky Point, Va.—Analysis, $CaCO_3$, 97%; $MgCO_3$, 75%; 50% thru 200 mesh, burlap bags, 3.50; paper, 3.25; bulk 2.00

Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk 2.50

Agricultural Limestone

(Crushed)

Bedford, Ind.—Analysis, 98% $CaCO_3$; 1%, $MgCO_3$; 90% thru 10 mesh..... 1.50

(Continued on next page)

Agricultural Limestone

Chico and Bridgeport, Tex.—Analysis, 95% $CaCO_3$; 1.3% $MgCO_3$; 50% thru 4 mesh	1.00
Davenport, Ia.—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 90% thru 10 mesh, per ton	1.25
90% thru 4 mesh, per ton	1.10
Dubuque, Iowa—50% thru 50 mesh	.85
Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh	1.00
Ft. Spring, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.00
Kansas City, Mo. — 50% thru 100 mesh	1.00
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio—90% thru 100 mesh	3.00
90% thru 50 mesh	2.00
90% thru 4 mesh	1.00
McCook, Ill.—90% thru 4 mesh	.90
Middlepoint, Bellevue, Bloomville, Kenton and Whitehouse, Ohio; Monroe, Mich.; Bluffton, Greencastle and Logansport, Ind.—85% thru 10 mesh, 20% thru 100 mesh	1.50
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Mountville, Va. — Analysis, 76.60% $CaCO_3$; $MgCO_3$, 22.83%, 100% thru 20 mesh; 50% thru 100 mesh, paper bags, 4.50; burlap bags	5.00
Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh	1.10@1.70
Stone City, Iowa — Analysis, 98% $CaCO_3$; 90% thru 50 mesh	.75
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh	2.15
Valmeyer, Ill.—Analysis, 96% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh	1.10@1.70

Pulverized Limestone for Coal Operators

Davenport, Ia.—Analysis 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; paper sacks	6.00
Hillsville, Penn., sacks, 4.50; bulk	3.00
Joliet, Ill. — Analysis, 52% $CaCO_3$; 42% $MgCO_3$; 95% thru 100 mesh; paper bags (bags extra)	3.50
Marblehead, Ohio — Analysis, 83.54% $CaCO_3$; 14.92% $MgCO_3$; 99.8% thru 100 mesh; sacks	4.25
Piqua, Ohio, sacks, 4.50@5.00; bulk	3.00@ 3.50
Rocky Point, Va.—85% thru 200 mesh, bulk	2.25@ 3.50
Waukesha, Wis.—90% thru 100 mesh, bulk	4.50

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Cedarville and S. Vineland, N. J.	*1.75@ 2.25
Estill Springs and Sewanee, Tenn.	1.50
Franklin, Penn.	2.00
Klondike, Mo.	2.00
Massillon, Ohio	3.00
Michigan City, Ind.	.30@ .35
Ohlton, Ohio	2.50
Ottawa, Ill.	1.25
Red Wing, Minn.	1.50
Rockwood, Mich.	2.25@ 3.00
San Francisco, Calif.	4.00@ 5.00
Silica and Mendota, Va.	1.75@ 2.00
St. Louis, Mo.	2.00
Utica and Ottawa, Ill.	.75@ 1.00
Zanesville, Ohio	2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio		1.50
Dresden, Ohio		1.25
Eau Claire, Wis.	4.25	
Estill Springs and Sewanee, Tenn.	1.35@1.50	1.35@1.50
Franklin, Penn.		1.75
Massillon, Ohio		2.00
Michigan City, Ind.		.30
Montoursville, Penn.		1.25
Ohlton, Ohio	1.75	1.75
Ottawa, Ill.	3.25	1.25
Red Wing, Minn.		1.00
San Francisco, Calif.	3.50	3.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Asbury Park, Farmingdale, Spring Lake and Wayside, N.J.		.55	1.10	1.25	1.40	
Attica and Franklinville, N. Y.	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.40	1.40	2.25		2.25	2.25
Buffalo, N. Y.	1.10	1.05	1.05	1.05	1.05	1.05
Erie, Penn.	.60	.85		1.25		1.25
Leeds Junction, Me.		.50	1.75		1.25	1.00
Machias Jct., N. Y.	.75	.65	.65	.65	.65	.65
Milton, N. H.		.50				.90
Montoursville, Penn.	1.00	.85	.70	.60	.50	.50
Northern New Jersey	.50@ .60	.50@ .60	1.25		1.35	1.25
Somerset, Penn.		2.00				
South Portland, Me.		1.00	2.50		2.25	
Troy, N. Y.	.50@ .75*	.50@ .75*	.80@1.00*	.80@1.00*		.80@1.00*
F. o. b. boat, per yd.	1.50	1.50	1.75	1.75		1.75
Washington, D. C.	.55	.55	1.20	1.20	1.00	1.00
CENTRAL:						
Algonquin, Ill.	.30*	.20*	.30*	.40*	.40*	.45*
Attica, Ind.			All sizes .75@.85			
Aurora, Moronts, Oregon, Sheridan, Yorkville, Ill.	.50	.35	.20	.50	.60	.60
Barton, Wis.		.40	.60	.65	.65	.65
Chicago, Ill.	.50	.50@1.45n	.60	.60@1.55n	.60	.60@1.90n
Chicago, Ill.	.30	.20	.30	.40	.40	.45
Columbus, Ohio¶		.60	.60	.60	.60	
Des Moines, Iowa		.30		1.40	1.40	1.40
Eau Claire, Chippewa Falls, Wis.	.40	.40	.55	.85	.85	
Elkhart Lake, Wis.	.60	.40	.50	.50	.50	.50
Ferrysburg, Mich.		.50@ .80	.60@1.00	.60@1.00		.50@1.25
Grand Haven, Mich.		.60@ .80	.70@ .90	.70@ .90		.70@ .90
Grand Rapids, Mich.	.50	.50	.90	.80	.70	.70
Hamilton, Ohio		1.00	1.00		1.00	
Hersey, Mich.		.50	.50	.60	.70	.70
Humboldt, Iowa	.35	.35	1.35	1.35	1.35	1.35
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Mankato, Minn.		.45g		.60@1.25h	.70@1.25	1.25e
Mason City, Iowa		.50	.85	1.25	1.25	1.25
Mattoon, Ill.			.75@.85 all sizes			
Milwaukee, Wis.	.96	.91	1.06	1.06	1.06	1.06
Minneapolis, Minn.	.35p	.35p	1.25q	1.25q	1.25q	1.25q
St. Louis, Mo.	1.15e	1.45f	1.45a	1.45	1.45	1.45
St. Paul, Minn.	.35	.35	.75	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.75	.85	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	1.50	1.25	1.10	1.10
SOUTHERN:						
Brewster, Fla.	.50	.50	3.00	3.00		
Brookhaven, Miss.	1.25	.70	1.25	1.00	.70	.70
Charleston, W. Va.			River sand and gravel, all sizes, 1.40			
Eustis, Fla.		.45				
Fort Worth, Texas	1.00	.90@1.10	1.25	1.00	1.00	1.00
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.20
Macon, Ga.	.65@ .90	.65@ .90	2.25@2.50	2.25@2.50	2.25@2.50	2.25@2.50
New Martinsville, W. Va.	1.10	1.00		1.30	1.10	.90
Roseland, La.	.35	.15	.85	.85	.75	.75
WESTERN:						
Kansas City, Mo.	.70@ .80	.70@ .75				
Crushton, Durbin, Kincaid, Largo, Rivas, Calif.	.10@ .40	.10@ .40	.50@1.00	.50@1.00	.50@1.00	.50@1.00
Oregon City, Ore.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Otay, Calif.		.35@ .40	.50@ .60	.50@ .60	.50@ .60	.50@ .60
Phoenix, Ariz. (k)	1.25*	1.15*	1.50*	1.15*	1.15*	1.00*
Pueblo, Colo.	.80	.60		1.20		1.15
Seattle, Wash.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Steilacoom, Wash.	.50	.50	.50	.50	.50	.50

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			.35			
Brookhaven, Miss.						.60
Buffalo, N. Y.	1.10	.95		.85		.85
Burnside, Conn.	.75*		1.30	1.10	1.00	1.00
Chicago, Ill.	1.25m			.35		
Des Moines, Iowa				.60		
Dresden, Ohio				.70	.65	
Eau Claire, Chippewa Fls., Wis					.65	
Fort Worth, Texas						.50r
Gainesville, Texas					.55	
Grand Rapids, Mich.				.50		
Hamilton, Ohio					1.00	
Hersey, Mich.				.50		
Indianapolis, Ind.			Mixed gravel for concrete work, at .65			
Macon, Ga.	.35					
Oregon City, Ore.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Somerset, Penn.		1.85@2.00		1.50@1.75		
Steilacoom, Wash.	.25					
St. Louis, Mo.			Mine run gravel, 1.35 per ton			
Summit Grove, Ind.	.50	.50	.50	.50	.50	.54
Winona, Minn.	.40	.40	.60	.60	.60	.60
York, Penn.	1.10	1.00				

*Cubic yd. ‡Delivered on job by truck. (a) ⅝-in. down. (b) River run. (c) 2½-in. and less. ¶By truck only. (d) Delivered in Hartford, Conn., $1.50 per yd. (e) Mississippi River. (f) Meramee River. (g) Washed and screened river sand. (h) ¼-in. to ½-in. (j) Lake sand, 1.75, delivered. (k) 60-70% crushed boulders. (m) Cu. yd., dune sand, f.o.b. cars, Chicago. (n) Cu. yd., f.o.b. cars, Chicago. (p) .65 cu. yd. (q) $1.75 to $2.00 cu. yd. (r) Pit run.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.00	2.00	2.25	.....	.....	4.00	.....
Beach City, Ohio	1.75@2.00	1.75@2.00	.....	1.50	1.75	.....	.....
Dresden, Ohio	1.25@1.50	1.25@1.50	1.50@1.75	1.00@1.25	.....	.....	.....
Eau Claire, Wis.	.....	.....	.....	.....	.....	3.00	.....
Elco & Tamms, Ill.	Ground silica per ton in carloads—18.00@31.00						
Estill Springs and Sewanee, Tenn.	1.25	.....	.....	1.25	.....	1.35@1.50	.....
Franklin, Penn.	1.75	1.75	.....	1.75	.....	.....	.....
Kasota, Minn.	.....	.....	.....	.....	.....	.....	1.00
Kerrs, Ohio	1.10@1.50	1.25@2.00	2.00	.....	.....	2.75@3.00	.....
Klondike, Mo.	2.00	.....	.....	2.00	.....	.....	.....
Massillon, Ohio	2.25	2.25	.....	2.25	2.50	.....	.....
Michigan City, Ind.	.....	.....	.....	.30@ .35	.....	.....	.....
Montoursville, Penn.	.....	.....	.....	1.35@1.60	.....	.....	.....
New Lexington, O.	2.00	1.25	.....	.....	.....	.....	.....
Ohlton, Ohio	2.00	2.00	.....	1.75	1.75	1.75	.....
Ottawa, Ill.	1.00	1.25	1.50	1.75	1.25	3.50	2.00
Red Wing, Minn.(d)	.....	.....	.....	.....	1.50	3.00	1.50
San Francisco, Calif.[1]	3.50†	5.00†	3.50†	3.50@5.00†	3.50@5.00†	3.50@5.00†	.....
Silica, Mendota, Va.			Potters	flint, 8.00@10.00g			
Utica & Ottawa, Ill.	.40@1.00f	40.@1.00f	.75@1.00	.40@1.00f	.60@1.00f	2.23@3.25	1.00@3.25
Utica, Ill.	.....	.60	.70	.....	.75	1.00	.....
Warwick, Ohio	1.50*@2.00h	1.50*@2.00h	.....	1.50*@2.00h	.....	.....	.....
Zanesville, Ohio	.....	2.00	1.50	2.00	2.50	2.00	.....

*Green. †Fresh water washed, steam dried. [1]Core, washed and dried. 2.50. (d) Filter sand, 3.00. (e) Filter sand ,$3.00@4.25. (f) Crude and dry. (g) Also 7.00. (h) Washed, 1.75.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Erie and Dubois, Pa.	2.25	1.25	1.25	1.35	1.25	1.25	1.25
Eastern Penn.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Penn.	2.00	1.00	.....	1.25	.....	.....	.....
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	.....	1.30*	.....	1.45*	1.45*	1.45*	.....
Jackson, Ohio	2.05*	1.05*	1.80*	1.30*	1.05*	1.30*	1.30*
Toledo, Ohio	1.50	1.35	1.35	1.35	1.35	1.35	1.35
SOUTHERN:							
Ashland, Ky.	2.05*	1.45*	1.80*	1.45*	1.45*	1.45*	1.45*
Ensley and Alabama City, Ala.	2.05	.55	1.25	1.15	.90	.90	.90
Longdale, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.05
Woodward, Ala.†	.....	.50*	.....	1.15*	.90*	.90*	.....

5c per ton discount on terms. †1¼ in. to ¾ in., $1.05; ⅝ in. to 10 mesh, $1.25*; ⅝ in. to 0 in., .90*; ¼ in. to 10 mesh, .80*.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.	.....	.....	12.00	.....	.....	.....	.....	2.00
Buffalo, N. Y.	11.50	7.50	7.50	12.00	8.00	11.00	7.50	1.50[16]
Lime Ridge, Penn.	.....	.....	.....	.....	.....	.....	5.00	.....
West Stockbridge, Mass.	12.00	10.00	5.60	.....	.....	.....	.....	2.00[13]
Williamsport, Penn.	10.00@11.00	8.50@9.00	8.50@9.00	.....	7.00	9.00	5.00	.....
York, Penn., & Oranda, Va.	11.50[7]	8.50@9.50[7]	8.50@9.50[7]	8.50@10.50[7]	8.00	9.25	7.00	1.40[5]
CENTRAL:								
Afton, Mich.	.....	.....	.....	.....	.....	10.00	7.50	.....
Carey, Ohio	11.50	7.50	7.50	.....	8.00	.....	8.00	.....
Cold Springs, Ohio	.....	8.00	7.50	.....	.....	.....	8.00	.....
Gibsonburg, Ohio	11.50	7.50	7.50	.....	8.00	10.00	.....	.....
Huntington, Ind.	11.50	7.50	7.50	12.00	8.00	11.00	7.50	1.50[16]
Luckey, Ohio	11.50	.....	.....	.....	.....	.....	.....	.....
Milltown, Ind.	.....	8.50@10.00	.....	10.00[8]	.....	.....	8.50[22]	1.35[10]
Ohio points	11.50	7.50	7.50	12.00	8.00	11.00	7.50	1.50[16]
Scioto, Ohio	11.50	7.50	7.50	8.50	8.25	.62½	7.00	1.50
Sheboygan, Wis.	.....	10.50	.....	.....	.....	.....	9.50	2.00[4]
Wisconsin points[6]	.....	11.50	.....	.....	.....	.....	9.50	.....
Woodville, Ohio	11.50	7.50	7.50	12.50	8.00	10.00[9]	8.00	1.50[3]
SOUTHERN:								
El Paso, Texas	.....	.....	.....	.....	.....	.....	7.00	1.50
Frederick, Md.	.....	8.00@9.50	8.00@9.50	.....	.....	9.50[15]	7.00[15]	.....
Graystone & Landmark, Ala.	12.50	9.00	.....	12.50	.....	.....	7.00	1.35
Keystone, Ala.	12.50	9.00	9.00	10.00	.....	.....	8.00	1.35
Knoxville, Tenn.	19.00	9.00	9.00	9.00	.....	.....	7.50	1.35
Ocala, Fla.	14.00	11.00	11.00	14.00	.....	.....	.....	.65[18]
WESTERN:								
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	15.00	.....
Los Angeles, Calif.	15.00	14.00	12.00	18.00	.....	.....	13.50	.....
San Francisco, Calif.	19.00	17.50	13.00	17.50@19.00	14.50	.90[17]	13.00	1.85[17]
Tehachapi, Calif.[19]	10.80	.....	6.75[11]	12.00	.....	.....	10.30	.....
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00	.....	18.60	2.30

[1] Barrels. [2] Net ton. [3] Wooden, steel 1.70. [4] Steel; in bbl. .95. [5] Dealers' prices, net 30 days less 25c discount per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days. [7] In paper bags, including bags. [8] To 11.00. [9]80-lb. [10] To 1.50. [11] Refuse or air slack, 10.00@12.00. [13] To 3.00. [15] To 8.00. [16] To 1.70. [17] Less credit for return of empties. [18] 90-lb. sacks. [22] To 9.00. [20] To 16.50.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing Sand	Traction
Utica & Ottawa, Ill.	1.00@ 3.25	.75
Warwick, Ohio	.....	2.00
Zanesville, Ohio	.....	2.50

*Damp.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:
- Crude talc (for grinding) ..... 4.00@50.00
- Ground talc (20-50 mesh), bags 8.00
- Ground talc (150-200 mesh), bags ..... 8.50@15.50
- Pencils and steel crayons, gross ..... 1.00@ 2.00

Chester, Vt.:
- Ground talc (150-200 mesh), paper bags ..... 7.50@8.50a
- Same, including 50-lb. bags ..... 8.50@ 9.50

Chicago and Joliet, Ill.:
- Ground (150-200 mesh), bags 30.00

Cromleys Mt., Md.:
- Crude talc 63.00

Dalton, Ga.:
- Crude talc (for grinding) 4.00
- Ground talc (150-200 mesh), bags 9.00
- Pencils and steel worker's crayons, per gross ..... 1.00@ 2.00

Emeryville, N. Y.:
(Double air floated) including bags;
- 325 mesh 14.75
- 200 mesh 13.75

Hailesboro, N. Y.:
- Ground white talc (double and triple air floated) 200-lb. bags, 300-350-mesh ..... 15.50@20.00

Henry, Va.:
- Crude (mine run) ..... 3.50@ 4.50
- Ground talc (150-200 mesh), bags ..... 8.75@14.00

Joliet, Ill.:
- Ground talc (150-200 mesh) in bags:
- California white 30.00
- Southern white 20.00
- Illinois talc 10.00

Keeler, Calif.:
- Ground (200-300 mesh), bags ..... 20.00@30.00

Natural Bridge, N. Y.:
- Ground talc (300-325 mesh), bags ..... 12.00@15.00

(a) Bags extra.

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

- Columbia, Tenn.—B.P.L. 65-70% ..... 3.50@ 4.50
- Gordonsburg, Tenn.—B.P.L. 65-70% ..... 4.25@ 4.75
- Mt. Pleasant, Tenn.—B.P.L. 78% ..... 6.50@ 6.75
- Tennessee — F.o.b. mines, gross ton, unground brown rock, B.P.L. 72% 5.00
- B.P.L. 75% 6.00
- Twomey, Tenn.—B.P.L. 65%, 2000 lb. ..... 8.00@ 9.00

Ground Rock

(2000 lb.)

- Centerville, Tenn.—B.P.L. 65% 8.00
- Gordonsburg, Tenn.—B.P.L. 65% 6.00
- B.P.L. 72% 8.00
- Mt. Pleasant, Tenn.—Lime phosphate: B.P.L. 73% to 75%, 98% thru 100 mesh, bags extra 11.70
- 80-85% thru 300 mesh, bags extra 11.80
- Twomey, Tenn.—B.P.L. 65% 8.00
- Wales, Tenn.—B.P.L. 65% 11.00

Florida Phosphate

(Raw Land Pebble)
(Per Ton)

- Florida — F.o.b mines, gross ton, 68/66% B.P.L., Basis 68% 3.25
- 70% min. B.P.L., Basis 70% 3.75

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

- New York City, N. Y.—Per lb., Cut mica (1½x2) 1.60
- Cut mica (8x10) 26.00
- Pringle, S. D.—Mine run, per ton 125.00
- Punch mica, per lb. ..... .06
- Scrap, per ton, carloads 20.00
- Rumney Depot, N. H.—Per ton, Mine run 300.00
- Clean shop scrap 25.00
- Mine scrap ..... 22.50@24.00
- Roofing mica 37.50
- **Punch mica, per lb.** ..... .12

Cut mica—50% from Standard List.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon, Vt. — English pink, English cream and coral pink	¶12.50@‖14.50	¶12.50@‖14.50
Brighton, Tenn.—Pink marble chips	§3.00	§3.00
Crown Point, N. Y.—Mica spar		9.00@10.00
Davenport, Ia.—White limestone, in bags	6.00	6.00
Easton, Penn.		8.00@ 9.00
Harrisonburg, Va.—Bulk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio—Concrete facings and stucco dash		11.00@18.00
Middlebrook, Mo.—Red		20.00@25.00
Middlebury, Vt.—Middlebury white	¶9.00@‖10.00	¶9.00@‖10.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags		4.00@ 5.50
Phillipsburg, N. J.—Royal green granite		16.00@20.00a
Randville, Mich.—Crystalite crushed white marble, bulk	4.00	4.00@ 7.00
Rose pink granite, bulk		12.00
Stockton, Calif.—"Nat-"rock" roofing grits		12.00@20.00
Tuckahoe, N. Y.—Tuckahoe white	8.00	
Warren, N. H.		¶7.90@‖8.95
Wauwatosa, Wis.		20.00@32.00
Wellsville, Colo. — Colorado Travertine Stone	15.00	15.00
Whitestone, Ga.		*10.00

†C.L. ‡L.C.L., 16.00.
¶C.L. ‖L.C.L. (a) Including bags.
*Per 100 lb.

Potash Feldspar

Auburn and Topsham, Me. — Color white, 98% thru 140-mesh	19.00
Buckingham, Ore.—White, analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white; analysis, K_2O, 9.63%; Na_2O, 1.01%; SiO_2, 69.72%; Fe_2O_3, .00%; Al_2O_3, 18.6%; bulk (crude)	9.00
East Hartford, Conn.—Color, white, 40 mesh to 200 mesh	15.00@28.00
East Liverpool, Ohio—Color, white; 98% thru 200 mesh, bulk	19.35
Soda feldspar, crude, bulk, per ton	22.00
Glen Tay Station, Ont.—Color, red or pink; analysis, K_2O, 12.81%; crude	7.00
Keystone, S. D.—White; bulk (crude)	8.00
Los Angeles, Calif.—Color, white; analysis, K_2O, 12.16%; Na_2O, 1.53%; SiO_2, 65.60%; Fe_2O_3, .10%; Al_2O_3, 19.20%; Arizona spar, crude, bags, 12.50@14.00; bulk	11.00@12.50
Pulverized, 95% thru 200 mesh; bags, 19.73@23.50; bulk	15.75@22.50
Pulverized, 20% thru 80 mesh; bags, 17.60; bulk	16.50
Murphysboro, Ill.—Color, prime white; analysis, K_2O, 12.60%; Na_2O, 2.35%; SiO_2, 63%; Fe_2O_3, .06%; Al_2O_3, 18.20%; 98% thru 200 mesh; bags, 21.00; bulk	20.00
Penland, N. C.—White; crude, bulk	8.00
Ground, bulk	16.50
Spruce Pine, N. C.—Color, white; analysis, K_2O, 10%; Na_2O, 3%; SiO_2, 68%; Fe_2O_3, 0.10%; Al_2O_3, 18%; 99½% thru 200 mesh; bulk (Bags 15c extra.)	18.00
Crude feldspar, bulk	9.00
Tenn. Mills—Color, white; analysis K_2O, 10%; Na_2O_3, 3%; 68% SiO_2; 99⅓% thru 200 mesh; bulk (Bags, 15c extra)	18.00
Toronto, Can.—Color, flesh; analysis K_2O, 12.75%; Na_2O, 1.96%; crude	7.50@ 8.00

Chicken Grits

Afton, Mich. (Limestone), per ton	1.75
Belfast, Me.—(Limestone), per ton	‡10.00
Chico and Bridgeport, Tex.	12.00
Danbury, Conn.; Adams, Ashley Falls, and West Stockbridge, Mass. (Limestone)	‡7.50@*9.00
Davenport, Ia.—(Limestone) bags, per ton	6.00
Easton, Penn.—In bags	8.00
El Paso, Tex.—Per ton	1.00
Knoxville, Tenn.—Per bag	1.25
Los Angeles, Calif.—Per ton, including sacks:	
Feldspar	14.00
Gypsum	7.50
Marion, Va.—(Limestone), bulk, 5.00; bagged, 6.50; 100-lb. bag	.50
Middlebury, Vt.—Per ton	10.00
Randville, Mich.—(Marble), bulk	6.00
Rocky Point, Va.—(Limestone), 100-lb. bags, 50c; sacks, per ton, 6.00; bulk	5.00
Seattle, Wash.—(Gypsum), bulk, per ton	10.00
Tuckahoe, N. Y.	8.00
Waukesha, Wis.—(Limestone), per ton	8.00
Wisconsin Points—(Limestone), per ton	15.00
Winona, Minn.—(Limestone), sacked, per ton, $8.00; bulk, per ton	6.00

*L.C.L. †Less than 5-ton lots. ‡C.L. ¶100-lb. bags.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Albany, Ga.	10.00
Anaheim, Calif.	10.50@11.00
Barton, Wis.	10.50g
Boston, Mass.	17.00*
Brighton, N. Y.	19.75*
Brownstone, Penn.	11.00
Dayton, Ohio	12.50@13.50
Detroit, Mich.	13.00@16.00*d
Farmington, Conn.	13.00
Flint, Mich.	18.00†
Grand Rapids, Mich.	12.50
Hartford, Conn.	14.00@19.00*
Jackson, Mich.	13.00
Lakeland, Fla.	10.00@11.00
Lake Helen, Fla.	9.00@12.00
Lancaster, N. Y.	12.25
Madison, Wis.	12.50a
Mishawaka, Ind.	11.00
Milwaukee, Wis.	13.00*
Minneapolis, Minn.	10.00
New Brighton, Minn.	10.00
Pontiac, Mich.	12.50@15.00*
Pontiac, Mich.	11.50
Portage, Wis.	15.00
Prairie du Chien, Wis.	18.00@22.50
Rochester, N. Y.	19.75
Saginaw, Mich.	13.50
San Antonio, Texas	12.50@14.00
Sebewaing, Mich.	12.50
Sioux Falls, S. Dak.	13.00
South River, N. J.	13.00
Syracuse, N. Y.	18.00@20.00
Toronto, Canada (f)	†15.00e
Wilkinson, Fla.	12.00@16.00
Winnipeg, Canada	15.00

*Delivered on job. †5% disc., 10 days. ¶Dealers' price. (a) Less 50c discount per M, 10th of month. (d) 5% disc., 10th of month. (e) Delivered in city limits. (f) F.o.b. yard, 12.50. (g) Delivered Milwaukee, 13.00.

Portland Cement

Prices per bag and per bbl., without bags, net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.		3.70
Atlanta, Ga.		2.36
Baltimore, Md.		2.25@2.65
Birmingham, Ala.		2.00
Boston, Mass.	.47	1.88@2.73
Buffalo, N. Y.	.52½	2.10@2.50
Butte, Mont.	.90¾	3.61
Cedar Rapids, Iowa		2.24
Charleston, S. C.		1.85
Cheyenne, Wyo.	.64	2.56
Chicago, Ill.	.51¼	2.45
Cincinnati, Ohio		2.62
Cleveland, Ohio		2.64
Columbus, Ohio		2.62
Dallas, Texas		1.80
Davenport, Iowa		2.24
Dayton, Ohio		2.64
Denver, Colo.	.63¾	2.55
Des Moines, Iowa		2.05
Detroit, Mich.		1.95
Duluth, Minn.		2.04
Houston, Texas		1.90
Indianapolis, Ind.	.54¾	2.59
Jackson, Miss.		2.44
Jacksonville, Fla.		2.60b
Jersey City, N. J.		2.13@2.53
Kansas City, Mo.	.45½	1.82
Los Angeles, Calif.	.62½	2.50
Louisville, Ky.	.55½	2.57
Memphis, Tenn.		2.44
Milwaukee, Wis.		2.20
Minneapolis, Minn.		2.12@2.22
Montreal, Que.		1.60
New Orleans, La.	.45½	1.82
New York, N. Y.	.50¾	2.03@2.43
Norfolk, Va.		2.07
Oklahoma City, Okla.	.57¼	2.29
Omaha, Neb.	.54	2.16
Peoria, Ill.		2.22
Philadelphia, Penn.		2.11@2.61
Phoenix, Ariz.		3.91*
Pittsburgh, Penn.		2.04
Portland, Colo.		2.80
Portland, Ore.‡		2.40@2.90a
Reno, Nev.‡		3.41a
Richmond, Va.		2.40@2.80
Salt Lake City, Utah	.70¼	2.81
San Francisco, Calif.‡		2.71a
Savannah, Ga.		2.60c
St. Louis, Mo.	.48¾	2.35
St. Paul, Minn.		2.12@2.22
Seattle, Wash.		2.90†
Tampa, Fla.		2.40
Toledo, Ohio		2.60
Topeka, Kans.	.50¼	2.01
Tulsa, Okla.	.53¼	2.13
Wheeling, W. Va.		2.52
Winston-Salem, N. C.		2.29
Mill prices f.o.b. in carload lots, without bags to contractors.		
Albany, N. Y.	.43¾	1.75
Bellingham, Wash.		2.10
Buffington, Ind.		1.80
Chattanooga, Tenn.		2.45*
Concrete, Wash.		2.55
Davenport, Calif.		2.05
Hannibal, Mo.		1.90
Hudson, N. Y.		1.75
Leeds, Ala.		1.65
Lime and Oswego, Ore.		2.50‡
Mildred, Kan.		2.30
Nazareth, Penn.		2.15
Northampton, Penn.		1.75
Richard City, Tenn.		2.05
Steelton, Minn.		1.85
Toledo, Ohio		2.20
Universal, Penn.		1.80

NOTE—Add 40c per bbl. for bags.
*Includes sacks. ‡10c discount, 15 days.
†10c discount 10 days.
(a) Includes cloth sacks returnable at 10c each.
(b) 24c bbl. refund for paid freight bill.
(c) 35c bbl. refund for paid freight bill.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	Gauging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ¼x32x 36". Per M Sq. Ft.	½x32x 36". Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10'. Per M Sq. Ft.
Acme, Tex.	1.70	4.00	4.00	4.00	4.00	4.50	.....	.....	.....	.....	.....	15.00	20.00
Arden, Nev., and Los Angeles, Calif.	3.00	8.00u	8.00u	10.70u	10.70u	.....	.....	.....	.....	11.70u	.....	.....	.....
Blue Rapids, Kan.	1.70	4.00	.....	.....	.....	.....	10.00	.....	.....	.....	.....	15.00	20.00
Centerville, Iowa	3.00	10.00	15.00	10.00	10.00	10.50	13.50	.....	.....	13.50	.....	.....	.....
Des Moines, Iowa	3.00	8.00	9.00	10.00	10.00	10.50	13.50	12.00	24.00	22.00	18.00	21.00	30.00
Detroit, Mich.	.....	.....	.....	.....	14.30c	12.30m	.....	m9.00@11.00o	.....	.....	.....	.....	.....
Delawanna, N. J.	.....	.....	.....	4.50@5.00	13.10@14.00	5.00	.....	7.25	.....	.....	.....	.....	25.00
Douglas, Ariz.	.....	.....	6.00	14.50	15.00	.....	18.00	.....	30.00	.....	.....	.....	.....
Fort Dodge, Iowa	1.70	4.00	6.00	9.00	9.00	9.50	.....	.....	.....	19.00	.....	15.00	20.00
Grand Rapids, Mich.	2.65	4.00	6.00	6.00	9.00	9.00	17.65	.....	22.75	19.00	12.00	15.00	18.00
Gypsum, Ohio	1.70@3.00	4.00	6.00	7.00@9.00	9.00	9.00	19.00	7.00	24.50	19.00	.....	15.00	20.00@25.00
Los Angeles, Calif.	4.90	7.50m	7.50m	8.40	9.00	.....	10.00	.....	36.00u	9.00	19.00	21.00	27.50
Medicine Lodge, Kan.	1.70	4.00	.....	.....	.....	.....	.....	.....	15.00	.....	.....	15.00	20.00
Oakfield, N. Y.	2.50	.....	.....	5.50	6.00	6.00	.....	5.50	.....	.....	.....	15.00	25.00
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	9.00	13.40	14.40	.....	15.40	.....	.....	.....	.....	.....	.....
Seattle, Wash. (b)	6.10	10.50	10.50	12.00	13.00	.....	.....	.....	.....	.....	.....	15.00c	22.50
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	20.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable). (a) Hardwall plaster, 13.00; casting, finishing, molding 14.00
(b) Calacoustic plaster 10.00 at mill; (c) Plaster lath; (m) includes paper bags; (o) includes jute sacks; (u) includes sacks. (v) retail 35.00.

Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City or shipping point	Sizes 8x8x16	8x10x16	8x12x16
Camden, N. J.	17.00	.....	.....
Cement City, Mich.		5x8x12—55.00¶	
Chicago District¶	180.00@210.00a	230.00@260.00a	280.00@330.00a
Columbus, Ohio	16.00	.....	.....
Detroit, Mich.	.15@ .17†	.....	.24@.26†
Forest Park, Ill.	21.00*	.....	.....
Grand Rapids, Mich.	15.00*	.....	.....
Graettinger, Iowa	.18@ .20	.....	.....
Indianapolis, Ind.	.10@ .12a	.....	.....
Los Angeles, Calif.	4x8x12—5.00*	.....	.....
Olivia and Mankato, Minn.	9.50b	.....	.....
Somerset, Penn.	.18@ .20	.....	.....
Tiskilwa, Ill.	.16@ .18†	.....	.....
Yakima, Wash.	20.00*	.....	.....

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡Delivered. ¶Price per 1000. (b) Per ton. (c) Plain. (d) 5x8x12—65.00 M, 5½x8x12—68.50 M.

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.	
Red	15.00
Green	18.00
Chicago, Ill.—Per sq.	20.00
Detroit, Mich.—5x8x12, per M	67.50
Houston, Texas—Roofing Tile, per sq.	25.00
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00
Waco, Texas:	Per sq.
4x4	.60

Cement Building Tile

Cement City, Mich:	
5x8x12, per 100	5.00
Chicago District (Haydite):	
4x 8x16, per M	130.00
8x 8x16, per M	220.00
8x12x16, per M	275.00
Columbus, Ohio:	
5x8x12, per 100	6.50
Detroit, Mich.:	
5½x8x12, per M	75.00
Grand Rapids, Mich.:	
5x8x12, per 100	8.00
Longview, Wash.:	
4x6x12, per 100	5.00
4x8x12, per 100	6.25
Mt. Pleasant, N. Y.:	
5x8x12, per M	78.00
Houston, Texas:	
5x8x12 (Lightweight), per M	80.00
Pasadena, Calif. (Stone Tile):	Per 100
3½x4x12	3.00
3½x6x12	4.00
3½x8x12	5.50
Tiskilwa, Ill.:	Per 100
8x8	15.00
Wildasin Spur, Los Angeles, Calif. (Stone-Tile):	Per 1000
3½x6x12	50.00
3½x8x12	60.00
Prairie du Chien, Wis.:	
5x8x12	82.00
5x4x12	46.00
5x8x 6 (half-tile)	41.00
5x8x10 (fractional)	82.00
	Each
Yakima, Wash. (Building Tile):	
5x8x12	.10

Cement Drain Tile

Graettinger, Iowa.—Drain tile, per foot: 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in., 1.35; 36-in.	2.00
Longview, Wash.—Drain tile, per foot: 3-in., .05; 4-in., .06; 6-in., .10; 8-in., .15; 10-in.	.20
Olivia and Mankato, Minn.—Cement drain tile, per ton	8.00
Tacoma, Wash.—Drain tile, per 100	
3 in.	4.00
4 in.	5.00
6 in.	7.50
8 in.	10.00
Waukesha, Wis.—Drain tile, per ton	8.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@40.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	17.00	.....
Chicago District	14.00	.....
Columbus, Ohio	16.00	17.00
El Paso, Tex.—Klinker	10.00	.....
Ensley, Ala. ("Slagtex")	9.00@12.00	.....
Eugene, Ore.	25.00	35.00@75.00
Forest Park, Ill.	.....	37.00
Friesland, Wis.	22.00	32.00
Longview, Wash.*	15.00	22.50@65.00
Los Angeles, Calif.	12.50	.....
Milwaukee, Wis.	14.00	30.00
Mt. Pleasant, N. Y.	.....	14.00@ 23.00
Omaha, Neb.	18.00	30.00@ 40.00
Pasadena, Calif.	10.00	.....
Philadelphia, Penn.	14.75	.....
Portland, Ore.	17.50	23.00@ 55.00
Mantel brick—100.00@150.00		
Prairie du Chien, Wis.	14.00	22.50@ 25.00
Rapid City, S. D.	18.00	30.00@ 35.00
Waco, Texas	16.50	32.50@125.00
Watertown, N. Y.	20.00	35.00
Westmoreland Wharves, Penn.	14.75	20.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	.....

*40% off List.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in
Detroit, Mich.								15.00 per ton									
Detroit, Mich. (c) Sewer	.10	.12	.22	.30	.40	.60	.90	1.20	.....	1.75	2.00	2.50	3.30	4.50	5.75	6.50	8.00
Culvert	.....	.....	.....	.....	.95	1.25	1.60	.....	.....	2.25	2.50	3.00	3.50	5.00	6.50	8.00	10.00
Grand Rapids, Mich.	4 in. to 12 in., 72% off standard sewer price list; 15 in., 65% off; 18 in. to 24 in., 62% off; 27 in. to 36 in., 60% off																
Houston, Texas	.....	.19	.28	.43	.55½	.90	1.30	.....	1.70†	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.75	.85	.90	1.15	.....	.....	1.60	.....	2.50	.....	.....	.....	.....	.....
Longview, Wash.	Sewer pipe 40% off list; culvert—list																
Mankato, Minn. (b)	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.75	2.50	3.25	4.25	.....	.....	.....
Newark, N. J.	6 in. to 24 in., $18.00 per ton																
Norfolk, Neb. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Olivia, Mankato, Minn.	12.00 per ton																
Paullina, Iowa‡	.....	.....	.....	.....	.....	.....	.....	2.25	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Somerset, Penn.	.....	.....	.....	.....	1.08	1.25	1.65	.....	.....	2.50	.....	3.65	4.85	7.50	8.50	.....	.....
Tiskilwa, Ill. (rein.)	.....	.....	.....	.75	.85	.95	.70	1.55	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tacoma, Wash.	.15	.18	.22½	.30	.40	.60	.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wahoo, Neb. (b)	.....	.....	.....	.....	.95	.....	1.27	.....	.....	2.01	.....	2.73	3.78	4.58	6.24	7.19	8.11
Yakima, Wash.	.....	.....	.....	.....	.....	.....	1.42	.....	.....	2.11	.....	2.75	3.58	4.62	6.14	6.90	7.78

(a) 24-in. lengths. (b) Reinforced. (c) Delivered on job; 5% discount, 10th of month. †21-in. diam. ‡Price per 2-ft. length.

Construction Begun on Neville Island Cement Plant

CONSTRUCTION WORK has been started on the new cement plant of the Davison Coke and Iron Co. on Neville Island, in the Ohio river below Pittsburgh, Penn. The blast furnace of the American Steel and Wire Co. and 140 acres of ground were bought early this year, as noted in ROCK PRODUCTS, October 13. A byproduct coke plant will also be constructed on the site.

Production of pig iron and cement will be started next June and coke will be made by October, 1929.

The blast furnace will have a capacity of 600 tons of pig iron a day. The coke plant will consume 1000 tons of coal a day and the cement plant will have an annual capacity of 1,000,000 bbl. Provision is being made to treble the initial coke capacity, to double the pig iron capacity so as to increase the cement capacity by 50% in the future.

Arizona Lime Plant Resumes Operation Under Receiver

OPERATIONS at the plant of the Puntenney Lime Co., Puntenney, Ariz., have been resumed after about a year of intermittent production, according to information obtained recently from John Sheffield, general manager.

Production now approximates 200 bbl. of lime a day, said the general manager, but the plant is runing only about one-half capacity and is employing only 30 men. Fewer men are required to operate the lime works since the installation of oil burning equipment 18 months ago, said Mr. Sheffield.

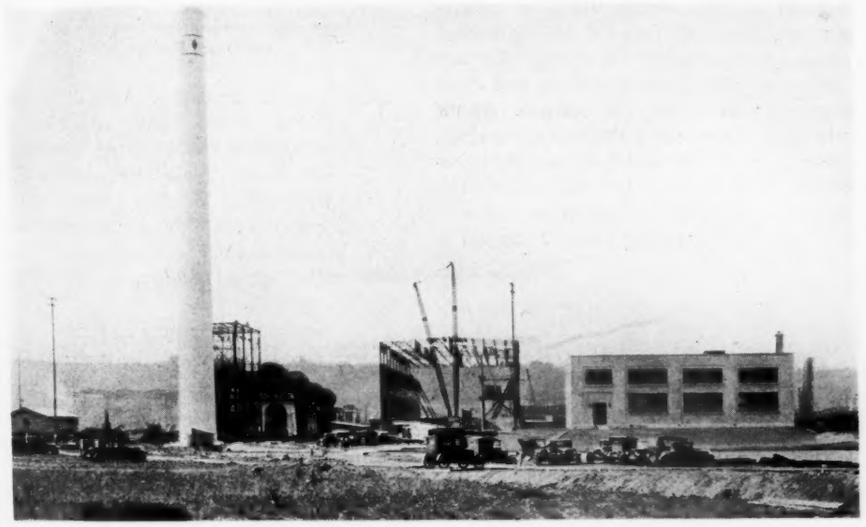
Several months ago the company got into financial straights and went into receivership. At this time it being operated under lease from the receivers.

During the time that the plant was in this situation production was intermittent only, but during the last 60 days production has been steady but on a small basis. For several months Mr. Sheffield occupied himself in the southern part of the state with lime kilns, but upon the new lease from the receivers he was recalled to take charge of affairs.—*Prescott* (Ariz.) *Courier.*

Work on Pacific Coast Cement Co. Plant at Seattle Progresses

THE new portland cement plant of the Pacific Coast Cement Co., now under construction at East Waterway, 3801 Marginal Way, Seattle, Wash., is well under way as shown by the accompanying photograph taken October 10.

The plant will have two 11 ft. 3 in. by 200 ft. Traylor kilns served by a 200-ft. stack that has an internal diameter of 10 ft., supplemented by a Cottrell precipitation plant that will be enclosed in a fabricated iron structure, according to a recent letter from S. E. Hutton, chief engineer for the cement company. The precipitator building is being erected by the Sheble Construction Co., McDowell building, and under the direction of the Western Precipitation Co. of San Francisco, who hold the general contract for this building and will equip it with the necessary machinery.



The new plant of the Pacific Coast Cement Co. at Seattle under construction

A clinker storage building 85 ft. by 336 ft., nine silos 24 ft. by 85 ft., a three-story bag house 75 ft. by 78 ft., a 75 ft. by 400 ft. wharf, rock storage facilities, 36 x 30 Dorr agitators are all in various stages of completion. Three 7 ft. by 45 ft. Traylor mills will be included in the grinding equipment.

Limestone for the plant will be hauled by the Pacific Coast Steamship Co., and for this purpose that company has purchased two boats, the *Eastern Coast* and the *Eastern Guide*, and are having installed the necessary hoppers for handling the rock.

New Japanese Cement Plant

THE Oriental Engineering Co., Ltd., Marunouchi building, Tokyo, Japan, have recently placed orders with American and Swedish manufacturers of cement machinery for equipment for a new cement plant and quarry which will be operated under the name of the Tokyo Cement Co., with headquarters at Tokyo, Japan.

S. Tanizawa, director of the Oriental Engineering Co. advises in a recent letter to ROCK PRODUCTS that the design of the plant will follow modern American practices and will have a capacity of 3000 bbl. per day. The primary and secondary crushers, steel conveyors, compressors, drill sharpeners and automatic weighing devices have already been ordered.

Idaho Cement Co. Promoters Give Assurance Regarding New Project

THE IDAHO PORTLAND CEMENT CO. will build a plant at Inkom, Idaho, with a capacity of 1,000 to 1,200 bbl. a day. Definite assurance of this was given September 25, by E. J. Simons, president of the company, who stated that $400,000 had been subscribed already, the land purchased, and machinery ordered of which the greater part will be on the ground by the first of the year. Every cent raised by the sale of stock will go into the treasury of the company, Mr. Simons said as no commissions are paid and the men interested in the company are paying their own expenses.

Mr. Simons was host to a number of the representative business and professional men of Pocatello at a dinner at the Hotel Bannock Tuesday evening. At this dinner every detail of the proposed plant was discussed. Mr. Simons made it clear that while the organization was seeking some support from the citizens of this state as it was his opinion that the new plant would mean a great deal for Idaho, nevertheless it would be constructed if all the capital necessary had to be raised in Spokane.

H. D. MacCosham, president of the chamber of commerce, assured Mr. Simons and his associates the support of the people of his community and their appreciation of the men who by their large investment showed their confidence in this community.

Mr. Simons, who by the way is a pioneer of the west, having been engaged in the sale and manufacture of construction and mining machinery in Montana and Washington for thirty years, explained how he happened to become interested in the lime rock deposits of this community. In his remarks he brought out the fact that he and his associates had spent the greater part of a year investigating and testing the quantity and quality of the deposits his company is soon to convert into a finished cement product. His investigation, in which several highly equipped scientists participated, developed the fact that the materials necessary in the manufacture of the highest quality of cement, exist at Inkom in a practically inexhaustible quantity and in a quality that is not surpassed in any part of the United States. He described the physical features of the property as being quite unusual, having regard to economy in manufacture. The advantages as to location together with the very high degree of the necessary content, associated with an instantly attractive market, so impressed him that he immediately proceeded with the purchase of the property.

Mr. Simons explained the nature of the organization of the company, which is capitalized at $500,000, adding that there is no promotion expense incurred in the transaction, assuring his guests that every dollar of the proceeds from the sale of the stock would go into the treasury of the company and be expended in the construction of the plant. He referred pleasantly to the fact that his Spokane friends had subscribed $400,000, or four-fifths of the total required capital quite promptly.

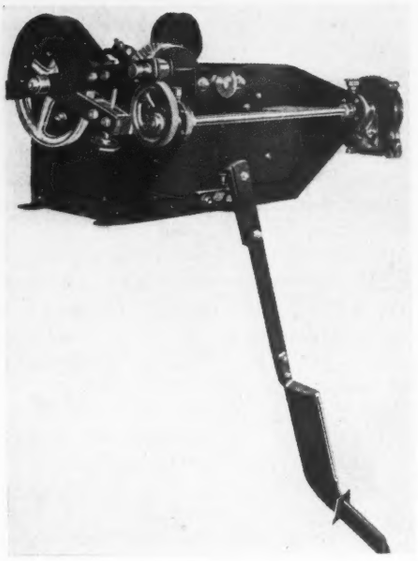
Secretary Maxfield has taken up his permanent abode in Pocatello, and is comfortably established with his wife and three children at 1006 North Arthur. He has opened offices on the ground floor of the Carlson building.—*Pocatello* (Idaho) *Tribune.*

Slate Association to Meet at New York

THE Slate News Bulletin calls attention to the Annual Slate Industry Conference that will be held at the Commodore Hotel, New York City, January 14 to 17, 1929.

That week has been designated a National Slate Week and the annual conference should be the source of many valuable ideas to the association members and others. All those who are interested in slate or in roofing problems are urged to attend and to make reservations at this time.

New Machinery and Equipment

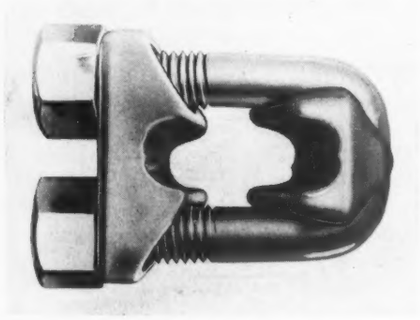


New style auto sampler suitable for use in cement plants

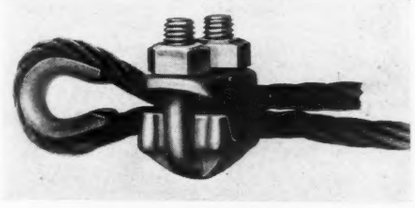
New Style Auto Sampler

THE GALIGHER CO. of Salt Lake City, Utah, recently announced a new type of auto sampler for taking wet or dry samples in industrial plants and in operations making ore treatments. This sampler should find use in cement plants as well as in the metallic minerals field since the application is much the same. The company claims efficient, position action, and accuracy, with this device, and states that the sampler is simple and very easy to install. It was designed to supplant the water tipping box and other sampling devices in ore treatment plants, and the company says that the new machine eliminates the inaccuracies and annoyances of the other methods, caused by irregular water pressure, stoppage of the small orifices, and similar trouble. The new sampler is self-contained and can be placed at any point to which an electric line can be strung. It can be fitted for direct connection to a motor or for connection by belt to a line shaft.

In this sampler a rotating cam on the shaft periodically contacts with a roller on the ratchet lever and raises the latter, thereby imparting a slow motion to the shaft through the roller friction ratchet and ratchet wheel. At the other end of this shaft in a bevel pinion which turns two bevel gears in opposite directions on a stationary shaft. As these latter turn, lugs on them contact with two weights hanging loosely on the stationary shaft, raising the weights upward. As the weights reach an upright position, they fall forward to the bottom again, and in doing so contact with the cam surface of one of the trip arms, and cause it to move to the opposite position. As the trip arms are mounted rigidly on the shaft, the motions due to the falling weights is imparted to the sampler bar and cutter. The device is adjustable to permit variation in the interval of sampling from 10 minutes to one hour.



New cable clip which has two grooved jaws



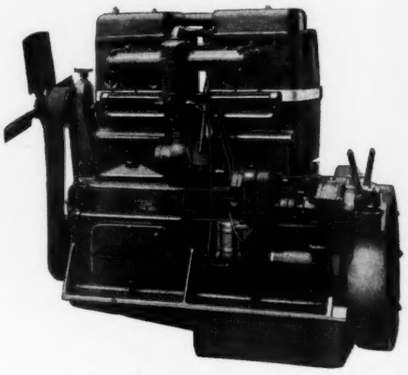
Cable clip in use, showing how both grooved jaws grip the cable

New Cable Clip Has Two Grooved Jaws

THE Eureka Metal Products Corp., North East, Penn., has announced a new patented cable clip having two jaws that are fully grooved for the cable, instead of only one. It is claimed that this new clip will carry three times the load possible with a clip which has only one grooved jaw and which permits the cable to be in contact with the U-bolt. The new construction provides a larger holding surface, thus permitting the heavier loads and also adding to the safety, it is stated. The manufacturers claim that the new clip prevents any distortion in the cable, no matter how tightly the nuts are pulled down, and thus there is considerable saving on the cable. The clip is being manufactured in a full range of sizes.

New Gas Engine With Large Power Range

IN the September 15, 1928, issue of ROCK PRODUCTS the announcement was made regarding a new internal combustion engine, a development of the Climax Engineering Co., Clinton, Iowa. It is stated, according to the manufacturers, that this engine will develop from 50-h.p. at 500 r.p.m. to 110-h.p. at 1200 r.p.m. and to be remarkably free from detonation under maximum load. The company has named this engine the "Blue Streak."

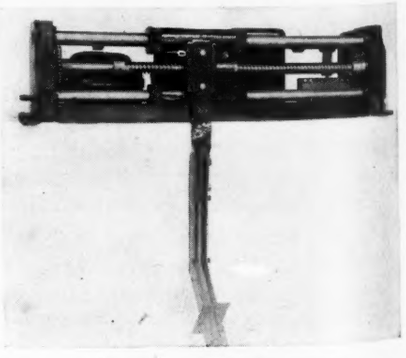


Internal combustion engine of unusual design

Electrically-Controlled Automatic Sampler

A NEW automatic, electrically-controlled sampler, known as the "Geary-Jennings Sampler," has been announced by J. F. Geary and H. C. Jennings, who jointly hold the patents on the equipment. Mr. Geary is a consulting metallurgical and mechanical engineer of Salt Lake City, Utah, and Mr. Jennings is a metallurgical engineer for the General Electric Co. of Schenectady, N. Y. The designers have been subjecting the new machine to practical tests during the past two years.

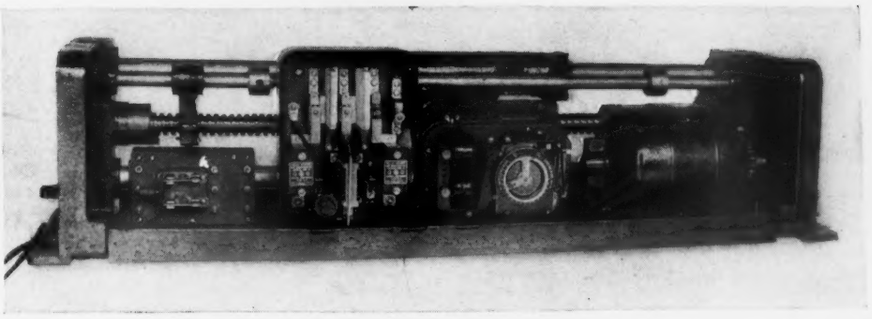
In the operation of this machine, the crosshead carrying the cutter slides on two guide rods, and is propelled horizontally across the



Automatic, electrically-controlled sampler with cover removed showing the screw, cutter carriage and cutter bar

stream to be sampled by means of a threaded shaft. This shaft is driven by a small motor, the entire operation of which is automatically controlled by standard electrical timing switches and magnetic switches. The timing switch is adjustable to obtain any sampling interval desired from two seconds to 36 minutes. It is stated that the movement of the sample cutter completely fulfills all the requirements of correct sampling, as it moves at regular time intervals in a straight line and at a uniform rate of speed. Lubrication has been carefully worked out so that the machine should not require greasing or an other attention oftener than once every three or four months, it is stated.

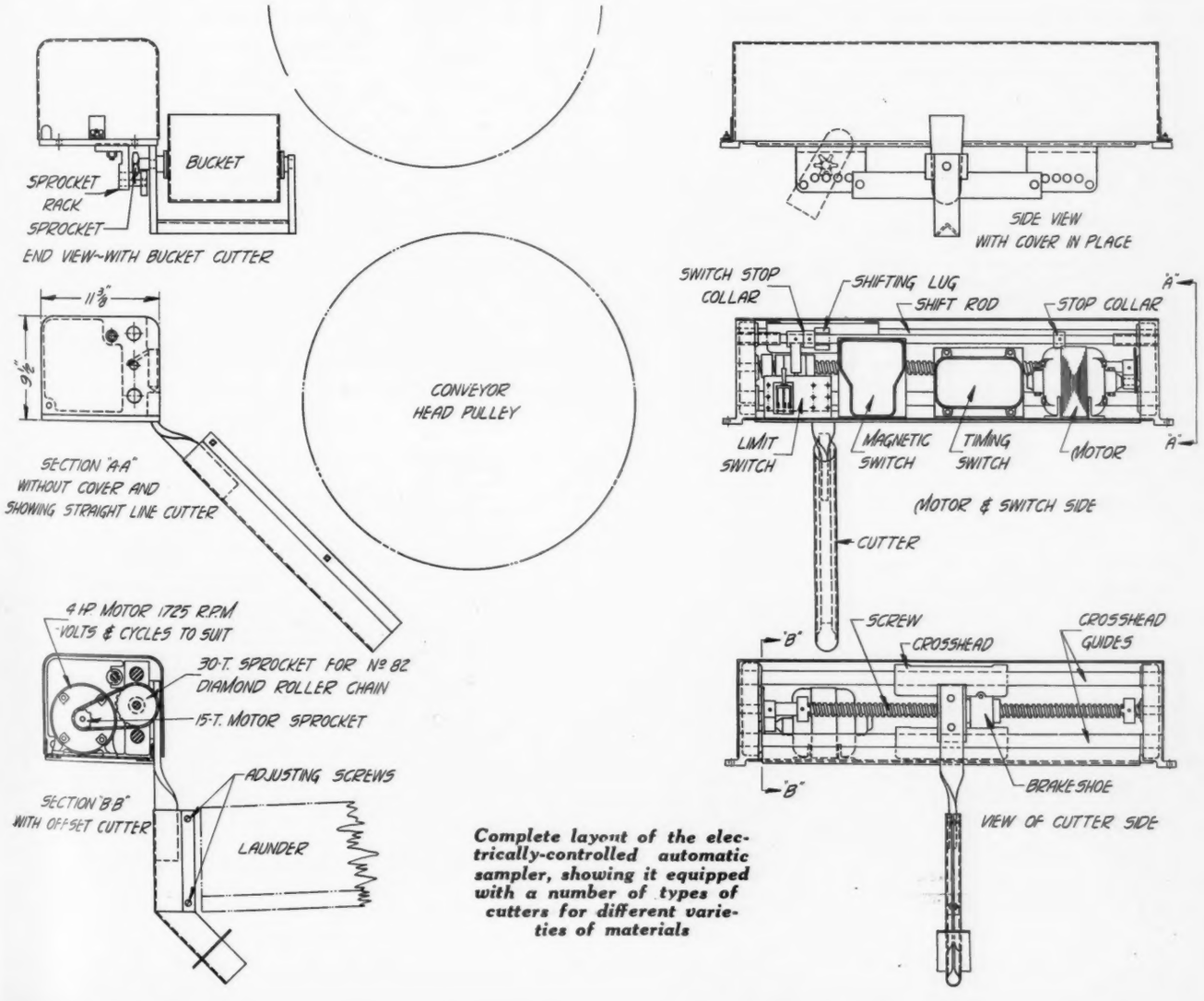
The entire mechanism is enclosed in a dust-proof, weather-proof housing, making it possible to install the sampler in wet and dirty places or out of doors with no shelter at all if desired, according to the designers. This housing is arranged to be padlocked in place, making it impossible for unauthorized persons to tamper with the sampler or interfere with its operation in any way. The small size, box-like shape and low headroom requirements of the sampler permit it to be installed in very cramped locations, the manufacturers have claimed.



The rear of the automatic sampler with the housing removed showing the electrical equipment of the machine

Any number of G. & J. samplers can be operated simultaneously by a master timing switch which may be placed in the plant superintendent's office or in any location desired. Samplers may also be operated in groups, or singly, if desired. The operating cost of the machine is almost nothing, it is claimed, as no power is consumed between cuts except that required to operate the timing switch.

The makers state that this sampler is adaptable to any type of cutter desired. The upper view in the accompanying drawing shows the sampler with a bucket cutter especially designed to handle dry material such as rod mill feed, crusher rolls discharge and other products similar to those found in the rock products field. These materials are frequently too coarse to pass through the ordinary cutter without possible clogging, but with this cutter the bucket dumps completely over at the end of travel, thus eliminating any chance of choking in the cutter.



Complete layout of the electrically-controlled automatic sampler, showing it equipped with a number of types of cutters for different varieties of materials

News of All the Industry

Incorporations

Rock Asphalt, Inc., M. R. Hutchinson and Alfred David.

Seaford Sand and Gravel Co., Seaford, N. Y., increase $12,000 to $16,000.

Producers Gravel and Sand Co., Shreveport, La., capital increase $100,000 to $200,000.

Joseph Riccardo, Inc., 156 Hawtree Ave., Jamaica, N. Y., $10,000. Cement products.

Washington County Sand and Gravel Co., Lincoln, Neb., incorporated in Kansas for $20,000.

Shrewsbury Texcrete Brick Co., St. Louis, Mo. L. S. Shafer, 1919 South Grand St., St. Louis.

Producers Gravel and Sand Co., Shreveport, La., has applied for charter to do business in Arkansas.

Serafinelli Granite Co., Quincy, Mass., $10,000. Guido Serafinelli, president, 496 Quarry St., Quincy, Mass.

Mozark Quarries Co., Doe Run, Mo. Walter H. Barenfinger, Vandalia, Mo.; Charles W. Medley, Knob Lick, Mo.

Union County Brick-Crete Block Co., Elizabeth, N. J.; 1000 shares, no par value. Charles A. Otto. Cement products.

Osakis Concrete Products Co., Osakis, Minn., $50,000. Peter, Agnes, Joseph John and Pauline Rutten, all of Osakis.

Mitchell Bay Lime Co., Bellingham, Wash., $50,000 in 50,000 shares at $1 each. H. P. Troy and George F. Yantis, Olympia, Wash.

Inter-State Cement Corp., Wilmington, Del., increase from 5000 to 5750 shares, no par value. Corporation Trust Co. of America, Wilmington.

Ready-Mixed Concrete Co., Minneapolis, Minn., 500 shares common, no par value; 500 shares preferred at $100 per share. J. A. Campbell, C. T. Welsh and Lee M. Derby.

Blue Mountain Mining Co., Blue Mountain, Miss., $375,000. Albert C. Anderson, Ripley, Miss.; G. A. Hazzard, Corinth, Miss. Owns 1000 acres of "paint rock" and options on 4000 acres more.

Kentucky Cement Corp., Wilmington, Del., 25,000 shares common, no par value. To manufacture and deal in fertilizer, shale, sand, clay, lead, cement, etc. (Project to build a portland cement plant near Frankfort, Ky.)

Cast Stone Co. of Illinois, succeeding the Chicago Architectural Stone Co., 332 South Michigan Ave., capital of which has been increased to $250,000. Forest R. Lowrey, W. F. Krohn, M. A. Williams. Cement products.

Diamond Springs Lime Co., Diamond Springs, El Dorado county, Calif., $100,000, par value $1 per share. H. P. Brown, E. E. Font, Odell Wilson, R. L. Hollingsworth and Effie H. Wilson. Total capital authorized, $200,000.

Rockdale Lime Co., Inc., Rockingham county, Va. (P. O. address, Linville, Va.) Robert L. James, president. Changing its name to Rocksdale-Coreen Lime Co., Inc., and changing location of principal office from Shenandoah county (P. O. address Tom's Brook), Va., to Rockingham county, Va. (P. O. address Linville, Va.). Laird L. Conrad, attorney, Harrisonburg, Va.

Quarries

Arkansas City Sand and Gravel Co., Arkansas City, Kan., is installing a 100-hp. Diesel engine at its Silverdale quarry.

Engineers Department, U. S. Government, recently reopened an old quarry at Hartsburg, Mo., to quarry rip-rap for flood-prevention work on the Mississippi River.

American Crushed Rock Co., Delaware, Ohio, has been awarded a contract for ballast for the four-track approach to the new Union Station, Cleveland, Ohio. About 1,000,000 tons is involved.

W. H. Swank, Fairfield, Iowa, is stripping the Harry Van Auken stone quarry at Farmington, Iowa, preparatory to beginning operations for the production of road stone and agricultural limestone. The quarry is on the Chicago, Burlington and Quincy R. R.

E. C. Schroeder, Mayville, Wis., has leased the Marquette Stone Co. quarry, McGregor, Iowa, and has installed a Link-Belt, 1-yd., gasoline shovel. Next spring Mr. Schroeder has announced plans to install a large initial crusher that will enable the plant to produce 100,000 tons a year.

Weyerhaeuser Timber Co. has its rock crushing plant near Hemlock Pass, Wash., 25 miles east of Kelso, in operation and is getting out 300 to 400 cu. yd. of crushed rock daily for use in ballasting the many miles of logging railway that have been constructed into the forested area between the Coweeman and Toutle rivers during the past year.

Sand and Gravel

National Sand and Gravel Co., Amite City, La., is reported to have made shipments to Central American ports.

Gemmer and Tanner, Inc., Post-Dispatch Bldg., Houston, Tex., have acquired a site at Calhoun and Dowling streets, Houston, for a gravel plant.

Wolf River Sand and Gravel Co., Memphis, Tenn., has moved its headquarters offices to 520 Falls Building, where larger space is available.

A. B. Brown and associates, Lockney, Tex., is completing a new $200,000 sand and gravel plant near Quitaque, Caprock county, Texas.

Bayou Sand and Gravel Co., Columbus, Tex., has purchased property on Walnut St., and plans are being made for the erection of a new office building for the company.

Missouri Portland Cement Co., St. Louis, Mo., is reported to have placed its sand and gravel plant at Beauchamp, Mo., in operation to supplement the output of its Jedburg plant. The Beauchamp plant is said to have been idle for a considerable period.

Gemmer and Tanner, Houston and Columbus, Tex., well-known operators of sand and gravel plants, have incorporated as Gemmer and Tanner, Inc., with a capital of $300,000. The firm has hitherto operated as a partnership. No changes in policy of methods of handling their extensive business will result from the incorporation, it was said.

American Aggregates Corp., Fort Jefferson, Ohio; five employes narrowly escaped death recently in an accident at the plant. When attempting to load heavy sand pump into a truck, a board floor on which the pump rested caved under the weight, precipitating the men and pump about 15 ft. to the ground. Luckily, not one of the men had been pinned under the full weight of the pump. One man had his left arm broken, two ribs cracked, and minor cuts; another, foot injury and ribs broken.

Cement

Atlas Portland Cement Co., Hannibal, Mo., employes contributed $219 to the Red Cross Florida relief fund.

Northwestern States Portland Cement Co., Mason City, Ia., is building a locomotive house. Macdonald Engineering Co., Chicago, are engineers and contractors.

Pacific Coast Cement Co., Seattle, Wash., has let a contract to the Macdonald Engineering Co., Chicago, Ill., for a stock house of approximately 110,000-bbl. capacity cement storage. There are nine reinforced concrete silos in the unit, each 24 ft. in diameter and 85 ft. high.

International Cement Corporation, New York, N. Y. In the construction of the new Moffat tunnel through the Rocky Mountains, west of Denver, Colo., unprecedented pressures were encountered from the soft rocks above. INCOR portland cement, a high-early-strength cement was used in lining the tunnel at those places with all around satisfaction. This type of cement is finding other extensive uses where delays of a few days would be serious and result in financial losses under ordinary conditions.

Pacific Coast Cement Co., Seattle, Wash., has awarded contracts as follows, in connection with the construction and completion of the new cement plant at 3801 East Marginal way, including superstructures for a cement mill and coal building, approximately 1000 hp. in electric motors and a 10-panel switchboard. The buildings, for which Peder P. Gjarde, Lyon building, holds the general contract, will be of steel frame, concrete and corrugated metal construction, and work will be started on them at once. The motor order, involving machines ranging from 100 hp. down, was split between Westinghouse Electric and Manufacturing Co. and General Electric Co., while the switchboard award was given to the Westinghouse Electric and Manufacturing Co. The motors, to be direct-connected to individual machines, will be delivered within two to six weeks time.

Southwestern Portland Cement Co., Osborn, Ohio, entertained, October 10, 95 members and guests of the Dayton chapter of National Association of Cost Accountants at a dinner meeting in Osborn. Max Monroe, president of the chapter, introduced J. W. Hearron and Fred Doupe, committee in charge of arrangements. Mr. Hearron spoke of the different processes of manufacturing cement and outlined in detail the methods of arriving at cost. He also spoke of the various phases of welfare work being carried on at the plant—among them life insurance without cost and a 1% bonus to departments which operate through a month without lost time or accidents. Allison Jennings, of the chemical laboratory department, spoke on the processes involved in the making of cement and gave a brief history of the cement industry. Following the dinner the visitors were taken on a tour of inspection of the plant.

Cement Products

Eastern Hume Concrete Pipe Co., 80 Federal St., Boston, Mass., is building a plant at Haverhill, Mass., to manufacture concrete pipe and concrete brick.

Chicago Cement Products Co. is the new name for the Chicago Granite Co., Elmwood, Park, Ill., according to a recent announcement. Correspondent: Deming, Jarrett and Mulfinger, 160 N. La Salle St., Chicago.

Gypsum

Standard Gypsum Co., San Francisco and Long Beach, Calif., has recently purchased a 350-hp. Busch-Sulzer diesel engine for its mine and crushing plant on San Marcos Island, Lower California. The engine is direct-connected to an electric generator and this unit will supplement a similar power unit now in operation.

United States Gypsum Co., Chicago, Ill.; a "tear-down" permit has been issued by the Bureau of Building Inspection, Philadelphia, Penn., to the Morton C. Tuttle Co. for the demolition of two brick buildings at 58th St. and Schuylkill River to make way for a large development of manufacturing buildings for the United States Gypsum Co. The proposed work will consist of one of the largest industrial developments in Philadelphia in some time and will represent an investment of more than $1,500,000.

Miscellaneous Rock Products

United Talc and Crayon Co., Glendon, N. C., A. L. Luff, president, announces that it will start grinding and shipping talc and making soapstone pencils about November 1.

Paul and Charles F. Gerheardt, Asheboro, N. C., are reported to be planning a talc development 15 miles east of Asheboro on Soapstone mountain. A 200-ft. prospect tunnel is under way. It is proposed to put up a pulverizing plant at Staley.

Feldspar Milling Co., Inc., Burnsville, N. C., recently organized, has work under way on a new feldspar grinding mill at Bowditch, N. C., that will have a daily output of 75 tons of finished material. It is purposed to install a third unit later. C. P. Rogers, Tryon, N. C., is president; Rudolph Glatly is manager, in charge of construction.

Personals

John C. Eden, president of the Superior Portland Cement Co., Seattle, Wash., recently underwent an operation at the Providence hospital, Seattle.

C. W. Streit, Jr., sales manager of the Southern Cement Co., of Birmingham, Ala., has been re-elected president of the Southeastern Association of the American Athletic Union.

J. Byron Harris, Cedar Rapids, Iowa, formerly a promotion engineer with the National Lime Association, spoke on the lime industry recently at a meeting of the Seattle Mining Club.

W. W. Norris, United States Gypsum Co., Chicago, Ill., addressed the members of the Construction Club, Cleveland, Ohio, recently, at a noonday meeting. The subject of his address was "The Manufacture and Practical Use of Gypsum in Building"—illustrated with motion pictures.

High Capacity and Low Crushing Costs *with* Newhouse Style "B" Crusher

Modern requirements demand low crushing costs which are governed by the ability of the crushing equipment to produce high capacities per crushing unit. The Allis-Chalmers Newhouse Style "B" Crusher, with its large receiving opening, short rigid main shaft and rapid crushing stroke, meets these requirements. The result of this high speed crushing stroke is high capacity with a uniform product at a minimum of power per ton of material crushed. The machine is self-contained with vertical motor.

The forged steel heat treated main shaft is of heavy proportions, hollow bored for strength and passage of the drive shaft from the motor.

Allis-Chalmers Newhouse Crusher Style "B"

Patented and Patents Pending

Lubrication is by external motor driven centrifugal pump with oil filter and cooler. The crusher is of heavy construction to meet the most severe crushing conditions. Concaves are reversible end for end. The machine is arranged for three point suspension by cables to the framework of the building, thus saving building space and foundation expense and eliminating building vibration.

The perfected Allis-Chalmers Newhouse Style "B" Crusher is the result of over seven years' work and study during which time all problems have been solved.

Made in three sizes — 7″ — 10″ — 14″ receiving opening.

THE ALLIS-CHALMERS MANUFACTURING COMPANY will, in the near future, announce another new type of crusher for fine crushing in which the capacity is relatively larger with respect to receiving opening than in the Newhouse Style "B" machine and will be especially suitable for those installations where larger capacity is desired and large receiving opening is not so essential. This new crusher will embody many improvements in which the industry is vitally interested.

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

Obituaries

Archer B. Mifflin, field engineer for the National Slate Association, died Sunday, October 14, 1928, after a prolonged illness. Mr. Mifflin was one of the first engineers in the East, especially in Philadelphia and New York to do missionary work among the architects for the Structural Slate Co.

Manufacturers

Nugent Steel Castings Co., Chicago, Ill., announces that Harold C. Osman, secretary, and heretofore in charge of sales for the company, has been appointed works manager.

American Locomotive Co., New York City, has received an order for five of the largest double-end type locomotives ever built in this country. They cost $59,000 each and the total weight of the engines and tender in working order is 352,000 lb.

Magnetic Mfg. Co., Milwaukee, Wis., announces the appointment of George F. Joyce as assistant sales manager for Chicago and vicinity. The Chicago office has been moved to new and larger quarters at 720 Cass St.

Atlas Imperial Diesel Engine Co., Oakland, Calif., has taken over the property and assets of the Pacific Diesel Engine Co. of that city, purchased for the sum of $405,000. Details of new financing to handle the expansion program of the company will be announced soon, it is reported.

Youngstown Sheet and Tube Co., Youngstown, Ohio, announces plans for increasing steel capacity of the company 30,000 tons a month through the building of four additional open hearth furnaces at their South Chicago plant. Contracts for the additional plants have been awarded the **Morgan Engineering Co.**

General Electric Co.'s sales billed for the first nine months of 1928 amounted to $242,676,762.07, as compared with $225,959,610.89 for the corresponding period last year. Profit available for dividends on common stock for the first nine months of 1928 was $38,841,625.31 as compared with $35,193,054.70 for the same nine months last year.

Hill Clutch Machine and Foundry Co., Cleveland, Ohio, announces the appointment of Calvin R. McGahey to their sales engineering force. Mr. McGahey will cover the Southern section of the country, including Virginia, Tennessee, North and South Carolina, Georgia, Alabama, Florida, Mississippi and Louisiana.

Thew Shovel Co., Lorain, Ohio, has added the following men to its sales force: A. L. McLain will be connected with the Dallas, Texas, office, under the direct supervision of V. L. Wheeler, district manager; G. D. Laurell, with residence at Alcoa, Tenn., will be attached to the Atlanta office in a sales capacity for both the Thew Shovel Co. and the Universal Crane Co.; H. S. Beale will be located at the New York office of the company; R. S. Delp at the Philadelphia office, and J. H. Devine and Malcolm Jones at the Chicago office.

Trackson Co., Milwaukee, Wis., has appointed the following new distributors to handle all lines of Trackson equipment: Motor Power Equipment Co., Ford Road and River Blvd., St. Paul, Minn.; Industrial Tractor Sales Co., Inc., 500 Fallsway, Baltimore, Md.; E. B. Kelly Co., N. Broadway, Box 22, Albany, N. Y.; W. B. May, Inc., 41 Perry St., Buffalo, N. Y.; Truck-Tractor Equipment Co., 460 Neilston St., Columbus, Ohio; Tractor & Equipment Co., 520-522 Passaic Ave., Newark, N. J.; and Service Supply Co., 20th and Venango Sts., Philadelphia, Penn.

Trade Literature

***NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention* Rock Products.**

Rollerless Rotary Screen. Bulletin No. H-46. Description of this type of screen with sketches and photographs. GALLAND-HENNING MANUFACTURING CO., Milwaukee, Wis.

The Screen Supreme. A 24-page booklet describing the company's vibrating screen equipment, illustrated with pictures of the screen and views of installations together with a number of dimension and assembly diagrams. TRAYLOR VIBRATOR CO., Denver, Colo.

Gasoline Locomotives. Bulletin No. 2822, covering 2½, 3½, 4½ and 5 ton gasoline locomotives for industrail uses with illustrations and diagrams of the locomotives and their parts, together with tables of specifications and hauling capacities. GEO. D. WHITCOMB CO., Rochelle, Ill.

Hydraulic Stripping. An attractive illustrated booklet outlining the method of stripping in quarries, etc., with a nozzle, and detailing the economies of this method. Views of present stripping installations are included, as well as illustrations of other applications in the industry. UNIVERSAL NOZZLE CO., Indianapolis, Ind.

Flexible Couplings. Bulletin No. 180, containing 16 pages and illustrated with cuts of various couplings and illustrations. Outlines the company's complete line of this equipment, including one new type, and has a number of tables of specifications of the various models. THE FALK CORP., Milwaukee, Wis.

Flexible Couplings for Motor, Turbine, and Engine Drives. Catalog No. 40, containing 32 pages on the various types of Francke flexible couplings, together with many illustrations of equipment and installations and a number of tables of specifications, dimensions, etc. SMITH & SERRELL, General Sales Agents, Newark, N. J.

Induced Draft. A 15-page illustrated bulletin detailing the installation of exhaust fans for firing locomotives and exhausting gases from round houses, written primarily for the railroad industry, but of interest to the rock products industry because of its suggested application in the latter field. BAYLEY BLOWER CO., Milwaukee, Wis.

Bucket Elevators. An illustrated catalog, No. 465, describing 184 bucket elevators of different styles or sizes, with capacities from 6½ to 750 tons an hour. The catalog also lists typical materials, giving their weights per cubic foot of volume and designing the type of elevator best suited to lift them. JEFFREY MFG. CO., Columbus, Ohio.

The Most Efficient Drive in Industry. A 56-page illustrated booklet on synchronous motors, written expressly for plant executives and managers in language which is not too technical. The book outlines a number of applications of these motors, with illustrations of these installation. ELECTRIC MACHINERY MFG. CO., Minneapolis, Minn.

Speed Reducers. A 12-page illustrated booklet covering the company's line of all types of speed reducers, together with many illustrations of their installation and drawings of their details. **Forgings.** A bulletin concerning the accuracy achieved in the forgings furnished by the company to an industrial concern. GEARS AND FORGINGS, Cleveland, Ohio.

Speed Reducers. Illustrated catalog **No. 166,** describing planetary speed reducers, heavy duty worm gear reducers, medium duty worm gear reducers, and herringbone reducers. The book is a very complete discussion of the subject, and is written in a clear and concise style. It contains 160 pages. D. O. JAMES MANUFACTURING CO., Chicago.

Storage of Coal and Other Bulk Materials. A new 56-page booklet, **Catalog No. 11,** devoted to the handling of bulk material, particularly coal, but also discussing the storage of stone, sand, gypsum rock and similar rock products. The book is well illustrated with views of the equipment and of installations, and also has numerous diagrams showing typical installations. SAUERMAN BROS., Chicago.

Crawler Excavating Equipment. A 40-page illustrated catalog giving construction details and specifications for crawler equipment from ½-yd. up to 1¼-yd. machines. Besides giving data on the capacities and operating ranges of the various machines, there are also a number of views of equipment giving interesting examples of various kinds of use. NORTHWEST ENGINEERING CO., Chicago.

Packing Service. A 176-page catalog handsomely bound and illustrated with cuts of all of the company's types of packing for bearings, pumps, valves, and similar places. The book is also illustrated with diagrams of typical uses for various kinds of packing, together with all the data accompanying the installations. The latter part of the book is taken up with tables containing a wide variety of useful engineering data. GARLOCK PACKING Co., Palmyra, N. Y.

Experiences in Changing to Pulverized Coal. An illustrated reprint from "Power Plant Engineering," detailing the problems met in making a change at one large industrial plant. **Unit Pulverizers. Bulletin No. 128** describing the installation, uses, and advantages of unit pulverizers, with numerous illustrations of equipment installed in various plants. STRONG-SCOTT MFG. CO., Minneapolis, Minn.

Rock Crushing Equipment. A 44-page bulletin describing crushers, screens, conveying equipment and other equipment for use in rock products plants, together with tables of specifications, capacities, etc. Exceptionally well illustrated with photographs and drawings of the various types of equipment and with several views of installations at plants in the field. GOOD ROADS MACHINERY CO., Inc., Kennett Square, Penn.

Chicago Pneumatic Bulletins. Bulletin 700 (Third Edition). Details and descriptions of horizontal, duplex, single and two stage compressors. Capacities 250 to 10,000 cu. ft./min. **Bulletin 720** (Fifth Edition). Descriptive details of horizontal, straight line, center crank type for stationary or semi-portable uses. Capacities 67 to 1085 cu. ft./min. **Bulletin 773** (Second Edition). Giant semi-Diesel oil engine of horizontal type, sizes 30 to 100 B. H. P. Class A-04. **Bulletin 786** (First Edition). Description of type P6, vertical, duplex, single acting compressors. Sizes 100 to 310 cu. ft./min. **Bulletin 787** (First Edition). Electric motor driven portable air compressors. **Bulletin 788** (First Edition). Type P6, vertical, single cylinder, power driven compressor of 17½ to 41 ft. displacement. CHICAGO PNEUMATIC TOOL CO., Chicago Pneumatic building, 6 East 44th St., New York.

Swing Hammer Pulverizers. A new catalog, **No. 450,** describing advantages, uses, and installations of swing hammer pulverizers, and listing 54 varieties of materials for which these pulverizers may be used successfully. Illustrations are given of the regular types, and also of some new kinds recently developed by the company, and the catalog is also provided with tables of specifications, dimensions, etc. JEFFREY MANUFACTURING CO., Columbus, Ohio.

User Experience—the Key to Future Nickel Steel Applications. A 16-page illustrated booklet outlining the methods used by the company in getting its message to technical men of various industries, and including a number of reproductions of the company's advertisements which appeared in technical magazines. **Uses of Nickel Steel in Various Industries.** Bulletin concerning the application of nickel steel in a number of fields, including automotive, mining, and miscellaneous industries. **Buyers' Guide.** A directory of manufacturers using nickel alloy steel in the construction of their products. INTERNATIONAL NICKEL CO., New York City.

G. E. Bulletins. GEA-19E. A.-C. enclosed magnetic switches suitable for starting small single-phase, two-phase and three-phase alternating current motors that can be thrown directly on the line. **GEA-556B.** Automatic welding head and control (automatic electrode-feeding device, magnetic-clutch type). **GEA-874B.** Type WO-200A arc welder, belt, motor, or gas-engine driven, stationary or portable, self-excited, variable voltage, single-operator. **GEA-1052.** General purpose synchronous motors, "7500 series," two-phase and three-phase, 75 to 200 hp. and 220 to 2200 volts. **Silent Gears, GEA-482A.** A 32-page illustrated bulletin on "Fabroil" and "Textolite" gears giving specifications and including ten tables of dimensions, formulas, diametral pitches, specifications, etc. **Electric Heat in General Electric Factories, GEA-1012.** A 32-page illustrated bulletin of applications for electric heat found in the company's own factories. GENERAL ELECTRIC CO., Schenectady, N. Y.

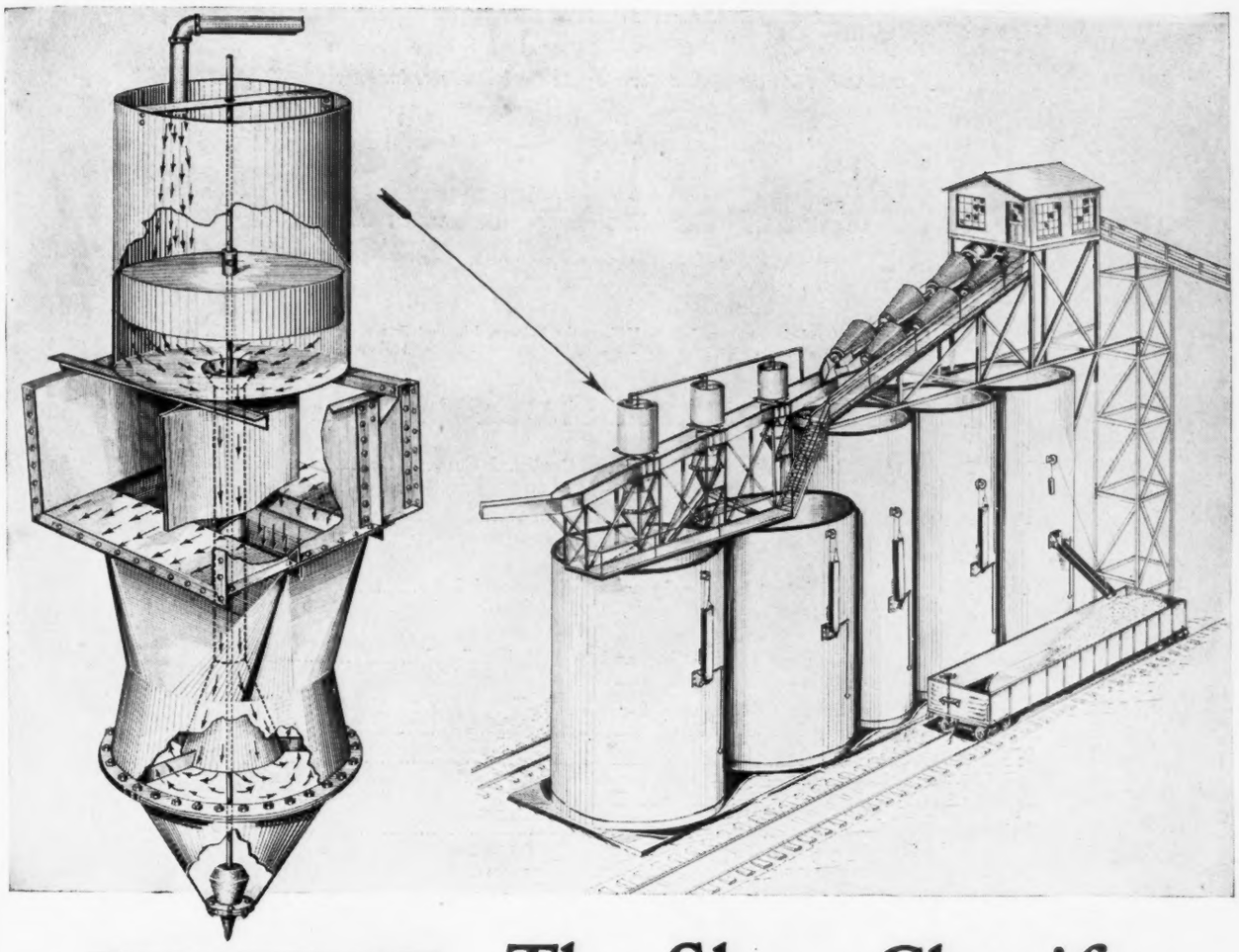
Insulation of Industrial Furnaces and Ovens. Bulletin **No. 108,** containing a clear and concise discussion of the problem of insulating furnaces and other heating equipment, illustrated with many drawings of typical installations and good practices, and containing numerous actual photographs of the company's installations. **Heat Insulation in the Smelting and Refining of Non-Ferrous Metals—** Four-page illustrated Bulletin **No. 102,** covering insulation of furnaces. **Better Concrete at Less Cost.** Illustrated folder, **No. 338,** on the use of celite in concrete. **Quality Concrete in Every Type of Structure.** An eight-page illustrated bulletin, **No. 340,** on the workability of cement and the methods by which satisfactory results can be obtained, including pictures of work in progress and completed. **High Temperature Insulation.** A 20-page reprint of a lecture prepared for presentation to students of engineering schools, containing a technical discussion of the problems of high temperature insulations. **Celite for Concrete.** A 16-page illustrated bulletin on methods of use and results obtained by addition of the company's products to concrete mixtures. CELITE PRODUCTS CO., Chicago.

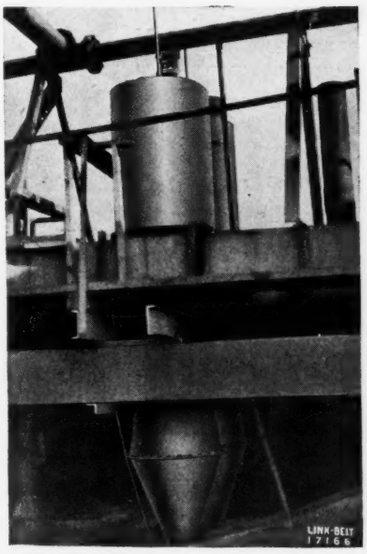
Petoskey Cement Building Packing Plant at Milwaukee

TWO large cement silos of capacities which will make Milwaukee one of the leading cement handling ports on the Great Lakes, will be erected on the Burnham canal in the Menominee valley by the Petoskey Portland Cement Co. of Petoskey, Mich., it was learned recently.

The two silos, with equipment, will cost about $100,000, it is said, and their construction will mark the entry of the third large cement corporation to the city of Milwaukee. The Manitowoc Portland Cement Co. already has two large silos on the Burnham canal, and the Huron Portland Cement Co. two more.

Ships coming into Milwaukee with cement will pump their cargo into the silos under force of compressed air and it will then be sacked for use here or shipment to other Wisconsin cities.





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